DOCUMENT RESUME

ED 343 475 HE 025 338

TITLE	Trends: The Canadian University in Profile. 1991 Edition.
INSTITUTION	Association of Universities and Colleges of Canada, Ottawa (Ontario).
REPORT NO	ISBN-0-88876-138-4; ISSN-0847-5482
PUB DATE	91
NOTE	125p.
AVAILABLE FROM	Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa, Ontario K1P 5N1 Canada ($37.45).
PUB TYPE	Statistical Data (110) -- Reports - General (140)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Academic Rank (Professional); Aging in Academia; Bachelors Degrees; College Faculty; Degrees (Academic); Doctoral Degrees; Educational Finance; *Educational Trends; Employment Patterns; Enrollment; Enrollment Trends; Financial Support; Foreign Countries; Full Time Faculty; Higher Education; Masters Degrees; Research; Sex Differences; *Statistical Data; Teacher Retirement; *Universities
IDENTIFIERS	*Canada

ABSTRACT

This report offers an overview of Canadian universities primarily by means of statistical data on enrollment, degrees, faculty, finance, and research. The report uses data from Statistics Canada and from the Organisation for Economic Co-Operation and Development. An introduction provides an analysis of the financial status of Canadian universities and the impact of the changes of the 1980s. The tables on enrollment provide data by level of education, registration status and sex, field and discipline, and by age and sex. The section of tables on degrees gives data on degrees granted by level and sex, by field and sex, and by field and discipline for diplomas, certificates, bachelor's degrees, master's degrees, and doctoral degrees. Data on faculty include tables on full-time faculty by major field, highest degree earned, rank, age distribution, attrition by age group, appointments, inter-institutional mobility, and new recruits. A section on finance provides statistics for government spending, expenditures on education by level, established program financing, total expenditures on university education, general operating expenditures, total university income, general operating income, and sponsored research income. A final section on research compares spending on research with various economic indicators and figures at the national and international levels. (JB)

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TRENDS:

The Canadian University in Profile

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TRENDS: THE CANADIAN UNIVERSITY IN PROFILE

1991 Edition

Research and Policy Analysis
Association of Universities and Colleges of Canada
Ottawa 1991

© 1991 AUCC
ISBN 0-88876-138-4
ISSN 0847-5482

Deposited with the National Library of
Canada
Printed in Canada

Copies may be obtained from the Publications
Office
Association of Universities and Colleges of
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151 Slater Street
Ottawa, Ottawa K1P 5N1

Price: Canada $37.45 (GST incl.); United States $40; other countries $40. Bulk orders of 5 or more - 10% discount.
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The National Library of Canada has catalogued this publication as follows:

Trends : the Canadian university in profile

Text in English and French; text in English only, 1991-
Title on added t.p., inverted: Orientations.
ISSN 0847-5482
ISBN 0-88876-138-4 (1991 ed.)

1. Education, Higher--Canada--Statistics.
2. Universities and colleges--Canada--Statistics.
I. Association of Universities and Colleges of Canada. Research and Policy Analysis.
II. Title: Orientations.

LA417.5.T73 1990 378.71'021 C90-090198-5E

ACKNOWLWDGEMENTS

The preparation of this publication has proven a most challenging project, demanding skill, patience, creativity, endurance, good humour, and most of all teamwork from the staff of AUCC's Research and Policy Analysis Division. Jean-Didier Dovi and Herb O'Heron performed the core analysis and authored the substantive chapters. Carolyn Masleck drafted the introduction. Ann Gratton and Herb O'Heron coordinated preparation of the final manuscript. Luc Rainville provided editorial support.

This publication relies exclusively on data provided by Statistics Canada and the Organization for Economic Co-Operation and Development (OECD). Of course, responsibility for the analysis and presentation of the information and for any errors or omissions rests solely with the Research and Policy Analysis Division.

Robert Davidson
Director
Research and Policy Analysis

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FINANCING EDUCATION: UNIVERSITIES LOSE GROUND IN THE 80s

Expenditure on education is an investment in the country's economy and in its people. For the country to grow and prosper, this investment should lead the growth in the economy. Projections of job training requirements show that two-thirds of all jobs created between 1989 and 2000 will require more than 12 years of education, and 40% will require more than 16 years. Certainly, Canadians placed an ever higher value on university education during the 1980s, as indicated by increased demand from qualified applicants.

Canadian universities responded by accommodating relatively large enrolment increases over the decade. But government, by far the most important source of funds for education in Canada, did not maintain its level of investment in the education sector. For example, in the late 1970s provincial-local governments spent about 26% of their budgets on education. But, during the 1980s that proportion declined steadily to only 23% by 1989. During that period, the proportion of the provincial spending allocated to universities remained relatively constant.

The federal government's principal contribution to the education sector is through Established Programs Financing (EPF), a transfer program which specifically tied federal support for postsecondary education to growth in the economy. But over the decade of the 1980s successive federal governments have compromised that commitment, first by fixing growth in EPF transfers to rates *below* economic growth and then by freezing per-capita transfers altogether.

As a result of these reductions in public sector support, universities faced severe financial constraints during the 1980s. Overall operating funds per student were 6% lower in 1989 than they had been in 1980. The priorities of universities can be seen in how they reacted to reduced funding. Cuts in library and physical plant expenditures were twice as deep as cuts to instructional expenditures. In addition, capital funding continued to decline despite the deterioration of many university buildings. The Canadian Association of University Business Officers (CAUBO) estimates that in 1989 alone, $750 million worth of maintenance costs were deferred.

The record of Canadian universities' activities during the 1980s should be examined in light of these difficult financial constraints. The remainder of this section provides some highlights of the trends in those activities.

Students Enrol in Record Numbers

Demand for education services increased over the period to the extent that many universities have not been able to accommodate all qualified applicants. The short-term coping response of many universities was to raise entrance standards and place enrolment restrictions on numerous programs. In addition, declining income from government sources compelled universities to look at tuition fees and other sources of income to augment their revenue base. By the end of the decade, real per student income from tuition fees was 20% higher than it had been in 1980. Despite these restrictions, university enrolment increased dramatically during the 1980s.

In 1989 there were 514,000 full-time students, 120,000 more than there had been in 1980. This remarkable growth of about 3% annually came about despite a decline of 13% in the population aged 18-24 during the decade. Part-time enrolment totalled 305,000 in 1989, up 24% from about 245,000 in 1980. Employing the commonly used measure of 3.5 part-time students equalling one full-time student, full-time equivalent (FTE) enrolment rose from 453,000 in 1980 to over 600,000 in 1989.

Number of Women Students Increases

The dramatic increase in enrolment over the decade is largely a result of increased enrolment of women. While the population trends are the same for both sexes, the changes in the university participation rates of men and women differ significantly. As a result of much higher enrolment growth, the 1989 participation rate of women aged 18-21 was four full percentage points higher than that of men, even though the rates had been exactly the same in 1980.

For the first time in 1989, women outnumbered men in full-time programs; this contrasts with 1980 when about 40,000 fewer women than men were enroled full-time. The number of women enroled in part-time programs increased steadily throughout the decade, while growth in the number of men was sporadic. Thus, by the end of the decade, women accounted for over 62% of all part-time students.

At the graduate level, women accounted for 41% of full-time enrolment in 1989 versus only 36% in 1980. As well, the number of women enroled part-time in graduate programs grew even faster than the number studying full-time, exceeding 50% of part-time enrolment in 1989, compared with 38% nine years earlier.

Growth in female enrolment was particularly strong at the doctoral level. In engineering/applied sciences it more than quadrupled, while the number in the health professions almost tripled. Despite these substantial increases, in 1989, women accounted for just 22% of doctoral enrolment in science-related fields and in engineering/applied sciences, their representation amounted to only 10%. By contrast, in 1989, about 45% of doctoral students in social sciences and humanities were women.

International Students Flock to Graduate Programs

Overall, during the decade, the number of international students increased but the enrolment patterns underwent some major changes. The number of full-time international students at the undergraduate level declined to 15,000 in 1989 from 17,100 in 1980. Much of this pattern was attributable to a sharp decline, in the mid-1980s, in the number of undergraduates from Malaysia and Hong Kong. In 1987, however, a gradual increase began in undergraduate enrolment of international students.

Trends at the graduate level were much different, as the number of international students rose almost steadily throughout the 1980s. Full-time enrolment in graduate programs rose 64% to over 12,000 students in 1989. Their share of all full-time graduate enrolment grew from 17% in 1980 to 20% in 1989. Moreover, by 1989, they accounted for 29% of full-time doctoral enrolment. These numbers have an impact on the proportion of women in doctoral programs, since only one-fifth of international students at the PhD level are female.

Graduates Reflect Changes in Field of Study and Gender Balance

The number of university graduates increased by almost 30% during the 1980s despite declines in real expenditures per student. The increases in graduates varied widely in different disciplines, suggesting that universities were not simply producing more graduates in lower cost disciplines than in higher cost disciplines.

For example, the number of bachelor's and first professional degrees granted by Canadian universities increased in all fields, ranging from under 1% in education and recreational studies to over 55% in mathematics/physical sciences.

During the 1980s, education/recreation and social sciences were the predominant fields in which master's degrees were granted. Combined, they accounted for more than half of all master's degrees awarded by Canadian universities.

A total of 2,578 doctoral degrees were granted in 1989, up almost 50% from 1,738 in 1980. During that period, the concentration of doctorates in science-related disciplines increased. By 1989, more than 55% of all doctorates granted were in these disciplines, compared with 50% nine years earlier.

It is also worth noting that for the first time since 1985, the number of PhD's in engineering/applied sciences declined in 1989. By comparison, the number of master's and bachelor's degrees granted in this field declined throughout the last half of the decade.

Despite substantial increases in all fields, women still accounted for a relatively small proportion of doctoral degree graduates in 1989. They obtained one-third of all doctorates in 1989, although differences by field of study were significant. Women accounted for over 40% of PhD graduates in the social sciences and humanities, but fewer than 20% of those in mathematics/physical sciences and just 6% in engineering/applied sciences.

Faculty Older on Recruitment, Whole Population Aging

During the 1980s, the number of full-time faculty at Canadian universities grew approximately 11%. By comparison, full-time equivalent enrolment grew by 33% over the same period, or triple the growth in full-time faculty. It is evident that the financial situation of universities limited the ability of universities to expand their faculty numbers at the same rate as their enrolments. The demographics of the faculty complement also had financial implications. An AUCC study of the labour market conditions in academe revealed relatively low retirement attrition and a significant increase in the number of faculty in the senior ranks. Both of these factors affected the financial resources of universities and limited their ability to expand.

One result of the inability to expand is that universities found it more difficult to increase the ratio of female to male faculty. The pool of qualified women increased at the same time as the ability of universities to expand decreased. Nevertheless, during the period 1976 to 1988, the number of female faculty increased 50%, while the number of male faculty rose 9%. Consequently, women accounted for 18.8% of the professoriate in 1988, up from 14.4% in 1976. The proportion of women increased in every field, but in some disciplines they still constituted fewer than one out of every 15 faculty members. For example, in 1988, just 2.9% of engineering faculty were women, and in mathematics/physical sciences the figure was only 6.3%. By contrast, in education, fine arts, humanities, and the health professions, about one out of four faculty members were female in 1988, up from one in five in 1976.

Despite stable labour market conditions, between 1976 and 1986, universities had a total influx of 16,789 new full-time faculty members, excluding those moving from one Canadian university to another. Over this decade, as a result of attrition and growth, universities renewed the equivalent of 53% of their full-time academic staff complement in 1976.

It has been assumed that PhD students constitute the principal source of new faculty, with other labour markets in Canada and abroad playing a secondary role. On average, however, 15% of new faculty were Canadian citizens recruited directly from the student market (including postdoctoral fellows) in Canada. Another 33% of new faculty were recruited from Canada's private and public sectors, while almost as many (32%) came from the international market. The employment experience of the remaining 20% of new appointees was not known.

But the relative insignificance of the student market is more apparent than real. A substantial number of recruits were recent graduates with non-academic labour market experience. Indeed, over half of new faculty hired between 1976 and 1988 were aged 35 or less. Recruits younger than age 30 represented a declining proportion of recruits, falling from almost 30% of all appointees in 1976 to fewer than 14% in 1988. Interestingly, 14% of new recruits were aged 45 or older in 1988, up from under 10% in 1976. As a result of these shifts, the average age of new recruits rose from 33.9 years in 1976 to 36.7 in 1988.

The increased age of new entrants into the profession cannot be readily explained. It may reflect the aging of PhD graduates as a result of the increasing time taken to complete postsecondary studies. It may also be due to higher qualifications (i.e., post-doctoral study, internships, etc.) required to enter the profession. The overall level of qualification of faculty increased at a steady pace from 1976 to 1988. The number of faculty with a doctoral degree or equivalent rose 29% from about 20,500 to 26,500, while the number holding less than a doctorate declined throughout most of this period. Consequently, by 1988, 73% of faculty held a PhD or equivalent, up from 65% in 1976. This trend underlines the extent to which the doctorate is becoming a prerequisite for a career in university teaching and research. In any event, the net result has been to exacerbate the problem of an aging professoriate.

The increasing number of professors at or near the top of the salary scale, and the increased number of staff recruited in mid-career, had a significant financial impact on universities. This was compounded by the need to raise salaries to compete with non-academic labour markets in recruiting and retaining staff. The Follow-Up to the 1982 Graduates Survey, carried out by Statistics Canada and Employment and Immigration Canada, revealed that the average salary of PhD graduates working in the university environment was second to last, and well below average, for employed PhDs. The result is that university spending on salaries increased substantially as a portion of overall expenditures.

Canada Behind G7 Partners in Research Spending

There was real growth in the funding of university research over the 1980s. Growth in research funding has both positive and negative aspects for the university as a whole. Research is central to the mission of the university, and helps provide a basis for the teaching function. Moreover, in Canada, university research makes up a relatively large proportion of the nation's R&D effort. On the negative side, research funding does not generally include the funding of the overhead or indirect costs associated with that research. Thus, in difficult financial times like the 1980s, additional research funding can cause financial stress in other parts of the universities.

Canadian gross domestic expenditure on research and development (GERD) amounted to almost $9.1 billion in 1990, reflecting real growth of 72% since 1979. The federal government and the university sector experienced a significant decline in the relative share of GERD they each performed, despite an increase in their expenditures levels. The decline in the federal government's share from 23% in 1979 to less than 16% in 1990, may be explained, in part, by the strategies of retrenchment and targeting fields and technologies for research.

Per capita GERD also reflects Canada's relative weakness in research and development. In 1989, Canada spent $227 per capita on R&D, lower than any G7 country except Italy. It should be noted, however, that in the U.S., as well as in France and the U.K., defense-related research comprises a significant proportion of R&D spending by governments.

The federal government's total funding for R&D amounted to $5.48 billion in 1990. This represents a 16% increase (in constant dollars) since 1983. In 1990, as in 1983, 80% of the expenditures were devoted to the natural sciences. R&D performed by the federal government itself absorbed the largest proportion of these funds, although the in-house share has declined from 63% in 1983 to 58% in 1990. Universities and industry receive fairly similar amounts (about 17% in 1990), although the latter's share is rising faster, especially in the natural sciences.

The granting councils' expenditures amounted to $800 million in 1990. In real terms, this was an increase of 29% over 1983. Over 90% of their expenditures was devoted to grants, contributions and human resource development over the period.

Between 1983 and 1990, the MRC had the largest increase in spending. Its total expenditures rose by 33% and 87% of its bugdet was allocated to grants and contributions compared with close to 10% for human resource development. Throughout the period, the MRC accounted for one third of the granting councils' total expenditures. The NSERC alone had made more than half of all granting councils' expenditures. In 1990, its expenditures amounted to $468 million. In real terms, this was a 29% increase over 1983. On average, 80% of its budget was spent on grants and contributions and 16% on human resource development programs. Of all the granting councils, the SSHRC allocated the largest proportion of its budget to human resource development. In constant dollar terms, its expenditures rose by 17% between 1983 and 1990, notwithstanding a relatively significant drop of 4.4% in 1987.

Higher education expenditures on research and development (HERD) amounted to $2.15 billion in 1990. In 1979, the university sector was its own major source of funds, contributing more than half of total expenditures. But by 1988, this share had fallen to 37%. By contrast, the federal government's contribution rose from 27% to more than 33% of total support of higher education research.

The provincial governments and private business have also played a growing role, as their financial support more than doubled since 1979 (in constant dollars). Provincial administrations provided almost 14% of total funding for R&D conducted by the university sector in 1990, up from 9% in 1979. At the same time, the business sector's share grew from 6% to more than 9%.

Canada leads the G7 countries in the university sector's proportional contribution to research and development efforts (i.e. HERD). In 1990, 24% of Canada's research and development expenditures (GERD) were made by universities. This, however, was down from about 26% in 1981. Except for Italy and the United States, all the other G7 countries reduced their share of GERD performed by the university sector. The sharpest drop was in Japan, where the university sector's proportion fell from almost 18% to less than 13% over the decade. Nonetheless, Canada's performance compared with its partners must be interpreted with caution, since a strong university presence in R&D could reflect either a dynamic university sector or poor performance by all other sectors. In fact, aside from Italy, Canada's HERD in relation to Gross Domestic Product (GDP) was the lowest in the group.

Looking Back to the 80s and Forward to the 90s

What conclusions can be drawn from these trends about the record of Canadian universities in the 1980s? In a period of severe financial restraints, the universities can point to some definite successes. They were able to increase enrolment to meet most of the demand for both full- and part-time programs, thereby ensuring the greatest degree of accessibility to all qualified applicants. The participation rates of women at all degree levels increased, even exceeding those of men at the undergraduate level. Universities were also able to increase the ratio of female to male faculty. The number of graduates increased, and the range of program offerings remained broad enough to meet student demand, despite the need to cut costs and stream-line. Throughout the decade, universities made a strong contribution to Canada's research and development efforts, signficantly increasing the amount of sponsored research they were performing at the beginning of the period.

If current trends continue, the demand for admission to universities will continue to outstrip the growth in levels of funding. In the 1991 budget, the federal government announced its intention to extend the freeze on increases in the post-secondary support portion of EPF for three years ending in 1994-95. Halting or reversing this trend will require new arrangements to reform or, more likely, replace EPF. Increasing the support of the business sector is one of the few alternative funding sources available to universities. The growth in this sector's funding of R&D in universities increased to a level which is high by international standards, but still represented only 9% of the total by 1989. The need to meet associated overhead costs will continue to be a source of concern.

Increasing the participation rates of under-represented groups, expanding graduate programs to meet the increased labour market demand for PhDs, and fulfilling Canadians' expectations of the university as gateway to economic well-being and personal development, are part of the challenge facing Canadian universities in the 1990s. Adequate financial resources are among the tools required to accomplish the task.

ENROLMENT

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Total University Enrolment by Registration Status and Sex 12

Undergraduate Enrolment by Registration Status 14

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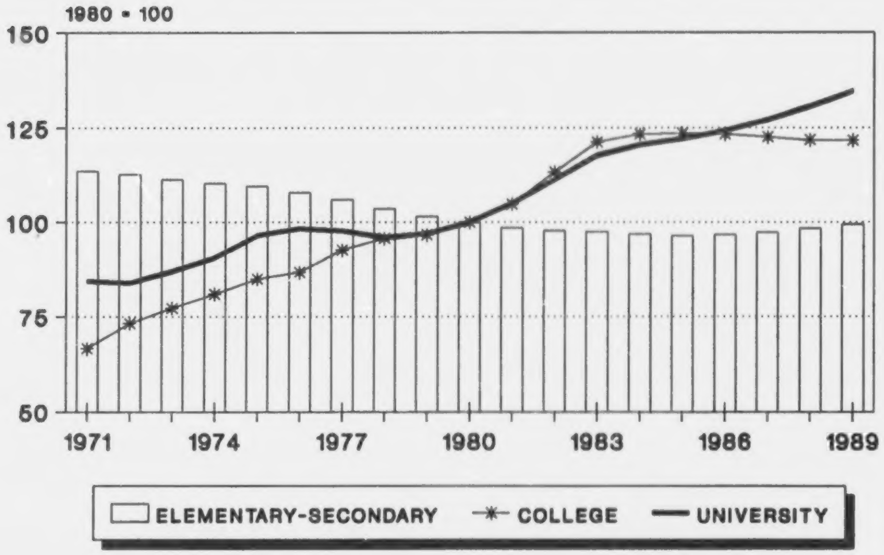
Full-Time Enrolment
by Level of Education

	ELEMENTARY-SECONDARY			COLLEGE			UNIVERSITY		
	Grade 6 & lower	Grade 7 & higher	Total	Career/ Technical	University Transfer	Total	Undergrad	Graduate	Total
1971	3,206,745	2,590,644	5,797,389	118,946	54,833	173,779	287,118	35,908	323,026
1972	3,133,054	2,618,593	5,751,647	127,735	63,219	190,954	284,839	36,116	320,955
1973	3,057,034	2,625,248	5,682,282	132,928	68,523	201,451	295,794	36,975	332,769
1974	2,993,951	2,630,603	5,624,554	138,817	72,387	211,204	307,976	38,690	346,666
1975	2,950,836	2,635,642	5,586,478	147,118	74,476	221,594	328,824	40,882	369,706
1976	2,867,913	2,637,820	5,505,733	149,656	76,505	226,161	334,883	41,589	376,472
1977	2,799,186	2,604,007	5,403,193	158,796	82,869	241,665	332,559	41,605	374,164
1978	2,745,848	2,540,949	5,286,797	167,888	81,880	249,768	325,485	42,295	367,780
1979	2,712,940	2,464,682	5,177,622	174,942	77,204	252,146	328,674	42,707	371,381
1980	2,707,912	2,391,710	5,099,622	182,372	78,389	260,761	337,952	44,665	382,617
1981	2,687,449	2,336,387	5,023,836	190,539	82,838	273,377	354,747	47,164	401,911
1982	2,668,295	2,319,668	4,987,963	207,709	87,866	295,575	376,214	50,175	426,389
1983	2,647,143	2,321,541	4,968,684	222,354	93,940	316,294	397,351	53,157	450,508
1984	2,656,193	2,284,105	4,940,298	225,871	95,666	321,537	406,198	54,885	461,083
1985	2,673,572	2,247,925	4,921,497	224,175	98,037	322,212	412,417	54,892	467,309
1986	2,696,536	2,235,193	4,931,729	220,483	101,012	321,495	418,308	57,150	475,458
1987	2,726,465	2,241,254	4,967,719	218,080	101,388	319,468	427,846	58,202	486,048
1988	2,772,489	2,245,355	5,017,844	216,379	101,117	317,496	439,588	59,843	499,431
1989	2,808,900	2,262,900	5,071,800	214,140	103,157	317,297	452,842	61,580	514,422

Enrolment Index 1980 = 100

1971	118.4	108.3	113.7	65.2	69.9	66.6	85.0	80.4	84.4
1972	115.7	109.5	112.8	70.0	80.6	73.2	84.3	80.9	83.9
1973	112.9	109.8	111.4	72.9	87.4	77.3	87.5	82.8	87.0
1974	110.6	110.0	110.3	76.1	92.3	81.0	91.1	86.6	90.6
1975	109.0	110.2	109.5	80.7	95.0	85.0	97.3	91.5	96.6
1976	105.9	110.3	108.0	82.1	97.6	86.7	99.1	93.1	98.4
1977	103.4	108.9	106.0	87.1	105.7	92.7	98.4	93.1	97.8
1978	101.4	106.2	103.7	92.1	104.5	95.8	96.3	94.7	96.1
1979	100.2	103.1	101.5	95.9	98.5	96.7	97.3	95.6	97.1
1980	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1981	99.2	97.7	98.5	104.5	105.7	104.8	105.0	105.6	105.0
1982	98.5	97.0	97.8	113.9	112.1	113.4	111.3	112.3	111.4
1983	97.8	97.1	97.4	121.9	119.8	121.3	117.6	119.0	117.7
1984	98.1	95.5	96.9	123.9	122.0	123.3	120.2	122.9	120.5
1985	98.7	94.0	96.5	122.9	125.1	123.6	122.0	122.9	122.1
1986	99.6	93.5	96.7	120.9	128.9	123.3	123.8	128.0	124.3
1987	100.7	93.7	97.4	119.6	129.3	122.5	126.6	130.3	127.0
1988	102.4	93.9	98.4	118.6	129.0	121.8	130.1	134.0	130.5
1989	103.7	94.6	99.5	117.4	131.6	121.7	134.0	137.9	134.4

INDEX OF FULL-TIME ENROLMENT BY LEVEL OF EDUCATION



Over the 1971 to 1989 period, enrolment trends varied at different levels of education. The steady decline in elementary-secondary enrolment experienced throughout the 1970s slowed during the first half of the 1980s, and in 1985, enrolment began to rise. Conversely, the dramatic college enrolment increases that occurred throughout the 1970s and early 1980s stopped abruptly in 1985. By contrast, except for a slight decline in the late 1970s, university enrolment grew constantly throughout the last two decades.

Elementary-secondary enrolment fell from 5.8 million students in 1971 to 4.9 million in 1985. Increases since then brought 1989 enrolment back to the 1980 level of 5.1 million students. Population growth was reflected in elementary enrolment increases starting in 1984. The upturn in the number of secondary students which began in 1987 was apparently a result of higher retention rates.

The number of college students in both career/technical and university transfer programs increased rapidly for almost 15 years. Since 1985, however, university transfer enrolment has continued to grow, but at a much slower pace. On the other hand, enrolment in career/technical programs declined steadily over the last half of the 1980s. In 1989, there were 214,000 students in these programs, the lowest since 1982.

In 1989, full-time university enrolment surpassed the half-million mark. There were almost 200,000 more full-time students in 1989 than there had been in 1971. In fact, enrolment increased by over 34% during the 1980s alone. The remarkably steady growth of about 3% annually during the 1980s came about despite a decline of 13% in the population aged 18-24 during that decade.

Total University Enrolment
by Registration Status and Sex

Total

	Full-time	Part-time	FTE[1]	Annual Rate of Change Full-time %	 Part-time %	 FTE %
1980	382,617	245,128	452,654			
1981	401,911	251,875	473,875	5.0	2.8	4.7
1982	426,389	266,386	502,499	6.1	5.8	6.0
1983	450,508	278,709	530,139	5.7	4.6	5.5
1984	461,192	277,826	540,571	2.4	-0.3	2.0
1985	467,279	284,956	548,695	1.3	2.6	1.5
1986	475,458	287,497	557,600	1.8	0.9	1.6
1987	486,048	294,512	570,194	2.2	2.4	2.3
1988	499,431	306,192	586,914	2.8	4.0	2.9
1989	514,422	304,622	601,457	3.0	-0.5	2.5

Male

	Full-time	Part-time	FTE	Full-time %	Part-time %	FTE %
1980	210,944	104,660	240,847			
1981	218,794	107,176	249,416	3.7	2.4	3.6
1982	231,414	111,021	263,134	5.8	3.6	5.5
1983	242,086	116,265	275,305	4.6	4.7	4.6
1984	244,280	114,976	277,130	0.9	-1.1	0.7
1985	243,857	115,955	276,987	-0.2	0.9	-0.1
1986	245,193	113,813	277,711	0.5	-1.8	0.3
1987	247,188	113,346	279,573	0.8	-0.4	0.7
1988	250,443	116,112	283,618	1.3	2.4	1.4
1989	253,762	114,358	286,436	1.3	-1.5	1.0

Female

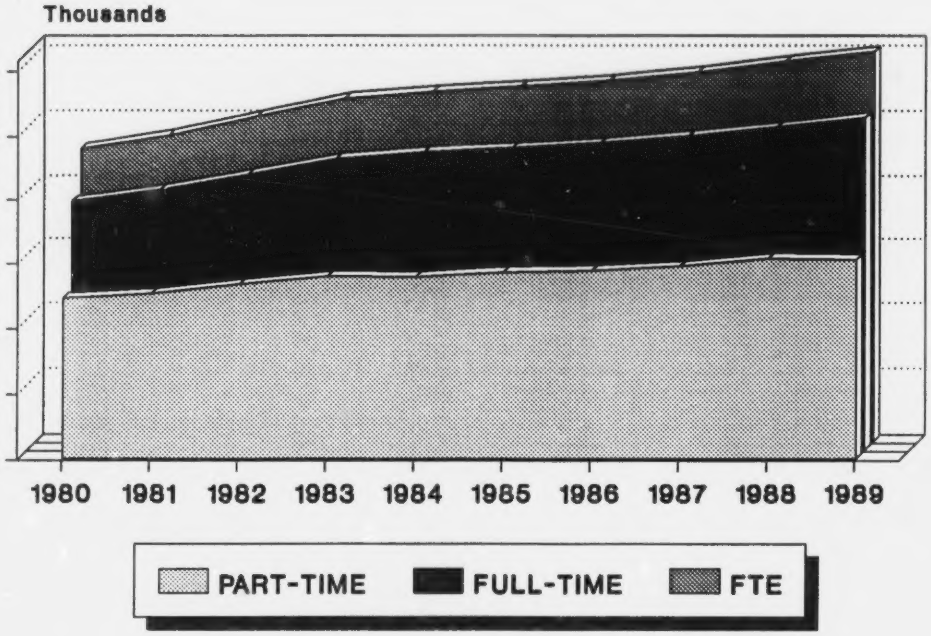
	Full-time	Part-time	FTE	Full-time %	Part-time %	FTE %
1980	171,673	140,468	211,807			
1981	183,117	144,699	224,460	6.7	3.0	6.0
1982	194,975	155,365	239,365	6.5	7.4	6.6
1983	208,422	162,444	254,835	6.9	4.6	6.5
1984	216,912	162,850	263,441	4.1	0.2	3.4
1985	223,422	169,001	271,708	3.0	3.8	3.1
1986	230,265	173,684	279,889	3.1	2.8	3.0
1987	238,860	181,166	290,622	3.7	4.3	3.8
1988	248,988	190,080	303,297	4.2	4.9	4.4
1989	260,660	190,264	315,021	4.7	0.1	3.9

Rate of Change During Decade

	Full-time %	Part-time %	FTE %
Total	34.4	24.3	32.9
Male	20.3	9.3	18.9
Female	51.8	35.5	48.7

[1] FTE: Full-time equivalent enrolment

TOTAL UNIVERSITY ENROLMENT BY REGISTRATION STATUS



During the 1980s, both full-time and part-time enrolment in Canadian universities increased. Full-time enrolment, however, grew at a faster pace than part-time enrolment.

In 1989, for the first time, full-time enrolment exceeded half a million students, up from only 380,000 in 1980; this amounted to a 34% increase during the decade. Growth was rapid until 1983, averaging 5.5% annually. The increase slowed to 1.3% in 1984, but a gradual rise since then brought the annual rate of growth back to 3.0% in the latter part of the decade.

Part-time enrolment totalled 304,600 in 1989, up 24% from about 245,000 in 1980. However, annual growth in part-time enrolment was quite erratic in the last six years of the decade.

Although no universally accepted measure of full-time equivalent (FTE) enrolment exists in Canada, one that is frequently used equates 3.5 part-time students to one full-time student. By this measure, FTE enrolment rose from 453,000 in 1980 to over 600,000 in 1989.

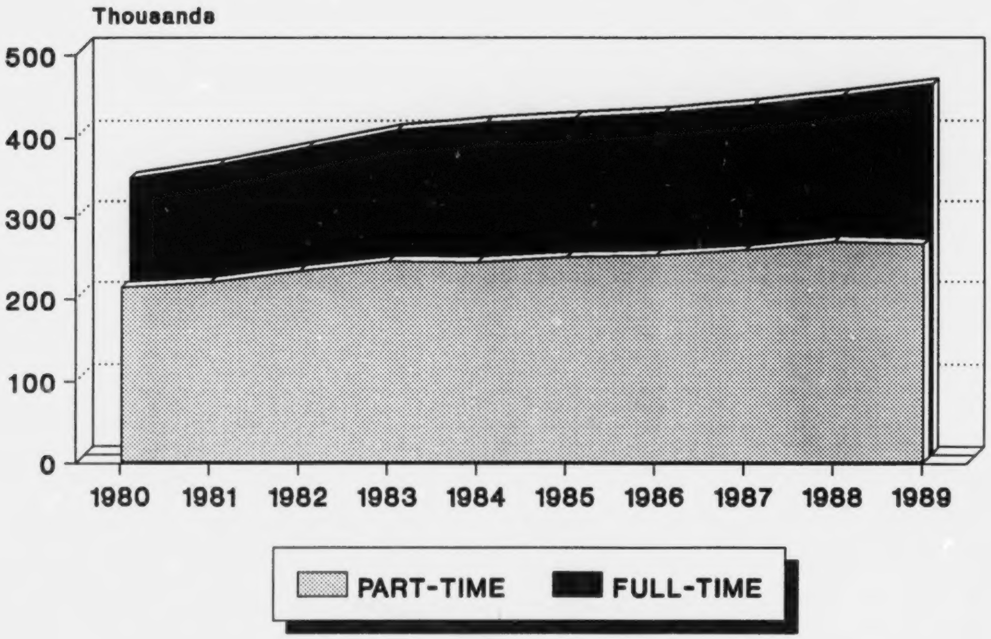
Also for the first time in 1989, women outnumbered men in full-time programs; this contrasts with 1980 when there had been about 40,000 fewer women than men enroled full-time. During the decade, the number of women in full-time studies rose by over 50%, compared with a 20% increase among men. Consequently, full-time female enrolment amounted to 260,000 in 1987 versus 254,000 men.

The number of women enroled in part-time programs increased steadily throughout the decade, while growth in the number of men was sporadic. Thus, by the end of the decade, women accounted for over 62% of all part-time students.

Undergraduate Enrolment
by Registration Status

	Full-time				Part-time			
	Bachelor's and First Professional	**Diploma and Certificate**	**Other**	**Total**	**Bachelor's and First Professional**	**Diploma and Certificate**	**Other**	**Total**
1980	317,471	10,930	9,551	337,952	104,042	43,544	65,440	213,026
1981	332,014	11,957	10,776	354,747	105,452	45,329	68,704	219,485
1982	351,099	12,880	12,235	376,214	109,916	45,265	77,870	233,051
1983	370,983	13,520	12,848	397,351	111,705	53,903	79,196	244,804
1984	379,939	13,359	13,008	406,306	110,769	55,981	76,950	243,700
1985	386,652	12,566	13,203	412,421	116,770	58,132	74,794	249,696
1986	390,610	12,701	14,997	418,308	116,477	58,898	76,320	251,695
1987	400,180	12,475	15,191	427,846	118,836	56,788	82,211	257,835
1988	412,238	12,436	14,914	439,588	121,652	59,601	87,302	268,555
1989	425,633	12,027	15,182	452,842	125,211	58,705	81,673	265,589
Annual Rate of Change								
	%	%	%	%	%	%	%	%
1981/1980	4.6	9.4	12.8	5.0	1.4	4.1	5.0	3.0
1982/1981	5.7	7.7	13.5	6.1	4.2	-0.1	13.3	6.2
1983/1982	5.7	5.0	5.0	5.6	1.6	19.1	1.7	5.0
1984/1983	2.4	-1.2	1.2	2.3	-0.8	3.9	-2.8	-0.5
1985/1984	1.8	-5.9	1.5	1.5	5.4	3.8	-2.8	2.5
1986/1985	1.0	1.1	13.6	1.4	-0.3	1.3	2.0	0.8
1987/1986	2.5	-1.8	1.3	2.3	2.0	-3.6	7.7	2.4
1988/1987	3.0	-0.3	-1.8	2.7	2.4	5.0	6.2	4.2
1989/1988	3.2	-3.3	1.8	3.0	2.9	-1.5	-6.4	-1.1
Women as Proportion of Total Enrolment								
	%	%	%	%	%	%	%	%
1980	46.0	47.9	44.2	46.0	60.9	59.7	59.1	60.1
1981	46.7	50.7	42.2	46.7	60.9	58.5	59.5	59.9
1982	46.8	50.2	42.4	46.8	60.6	60.5	60.6	60.6
1983	47.5	49.0	44.0	47.4	60.7	59.5	60.2	60.3
1984	48.2	50.7	45.1	48.2	60.7	60.1	60.5	60.5
1985	48.9	50.9	47.4	48.9	61.7	59.8	61.3	61.1
1986	49.5	52.6	48.6	49.5	62.6	61.2	62.4	62.2
1987	50.2	53.2	50.5	50.3	63.3	63.5	62.9	63.2
1988	51.0	52.2	51.3	51.1	63.7	64.4	63.4	63.8
1989	51.9	52.4	52.2	51.9	63.7	65.3	64.1	64.2
International Students as Proportion of Total Enrolment								
	%	%	%	%	%	%	%	%
1980	5.1	3.6	7.1	5.1	2.1	0.4	1.8	1.7
1981	5.7	3.5	7.2	5.7	2.5	0.3	1.7	1.8
1982	6.0	3.7	5.6	5.9	2.3	0.2	1.7	1.7
1983	5.7	3.8	4.5	5.6	2.5	0.2	1.5	1.7
1984	5.1	3.5	4.5	5.0	2.1	0.3	1.1	1.4
1985	4.3	2.9	4.4	4.2	2.1	0.2	1.0	1.3
1986	3.6	2.8	4.3	3.6	1.9	0.3	1.1	1.3
1987	3.2	3.4	4.3	3.3	1.5	0.3	1.0	1.1
1988	3.2	3.8	5.5	3.3	1.5	0.4	1.1	1.1
1989	3.2	3.9	6.1	3.3	1.6	0.4	1.5	1.3

UNDERGRADUATE ENROLMENT BY REGISTRATION STATUS



At the undergraduate level, students can register in three types of programs: bachelor's and first professional degree, diploma and certificate, and "other," which includes preliminary or updating year, non-university, special auditing, and courses taken without the object of attaining a qualification.

There was a net increase in undergraduate enrolment in all programs during the 1980s. Indeed, total full-time enrolment grew by almost 34%, from 338,000 students in 1980 to over 450,000 in 1989. Enrolment in bachelor's and first professional degree programs accounts for almost 95% of full-time undergraduates.

Total part-time undergraduate enrolment rose 25% between 1980 and 1989, from 213,000 to 265,600. More than half of this enrolment was in diploma/certificate and other programs, which grew 35% and 25%, respectively.

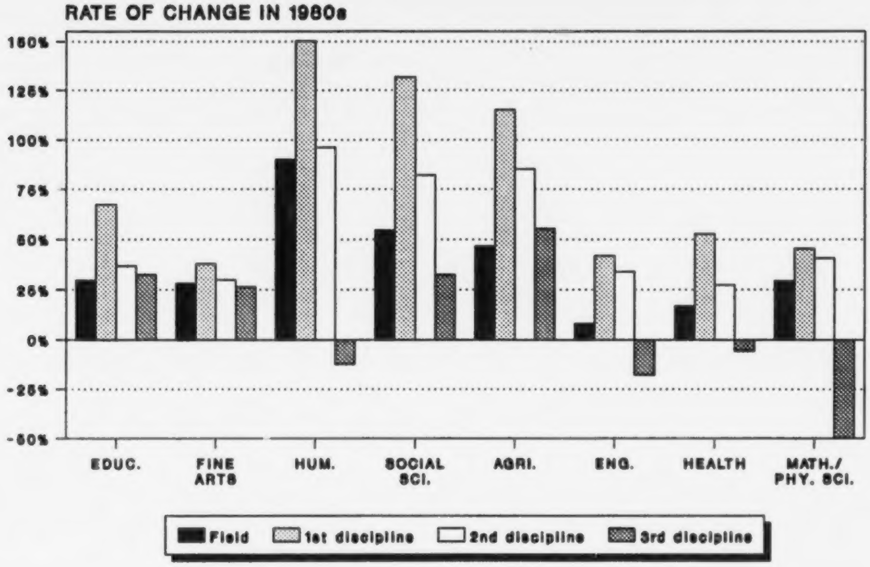
By 1989, 52% of full-time undergraduates were women, up from 46% in 1980. In part-time studies, women's representation was even more pronounced. They accounted for 64% of enrolment in 1989, a rise from 60% in 1980.

International students constitute a declining share of undergraduate enrolment. In 1989, 3.3% of full-time undergraduates were international students, down from a high of 5.9% in 1982. Similarly, among part-time undergraduates, the proportion of international students fell from 1.8% in 1981 to 1.3% by 1989.

Full-Time Bachelor's Enrolment
by Field and Discipline

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Rate of Change During Decade %
GENERAL ARTS/SCIENCES	64,284	68,125	73,856	78,413	65,770	66,865	63,671	65,616	68,028	68,801	7.0
EDUCATION/RECREATION	34,766	35,860	36,581	38,122	38,330	39,071	40,375	41,549	42,423	45,034	29.5
NON-TEACHING FIELDS	1,175	1,240	1,199	1,122	1,180	1,194	1,409	1,275	1,524	1,968	67.5
ELEMENTARY/SECONDARY	18,804	19,809	21,028	22,038	21,470	21,533	21,987	23,203	24,246	25,704	36.7
PHYSICAL EDUCATION	8,143	8,622	8,411	8,948	9,630	9,937	10,351	10,475	10,505	10,779	32.4
OTHER	6,644	6,189	5,943	6,014	6,050	6,407	6,628	6,596	6,148	6,583	-0.9
FINE/APPLIED ARTS	11,256	11,705	12,068	12,784	13,116	13,487	13,840	14,026	14,062	14,415	28.1
APPLIED ARTS	2,509	2,633	2,783	2,911	2,884	3,118	3,430	3,348	3,356	3,455	37.7
OTHER PERFORMING ARTS	1,403	1,414	1,575	1,700	1,715	1,738	1,724	1,816	1,813	1,823	29.9
MUSIC	3,232	3,342	3,448	3,632	3,729	3,893	3,943	4,031	4,016	4,087	26.5
OTHER	4,112	4,316	4,262	4,541	4,788	4,738	4,831	4,743	4,877	5,050	22.8
HUMANITIES	22,422	22,494	23,374	25,613	30,270	31,165	33,495	36,282	38,934	42,607	90.0
ENGLISH LANG./LIT.	5,327	5,297	5,957	6,619	8,594	8,897	9,720	10,894	12,033	13,331	150.3
FRENCH LANG./LIT.	2,657	2,860	2,833	3,013	3,663	4,034	4,188	4,615	4,749	5,216	96.3
THEOLOGICAL STUDIES	1,938	1,810	1,812	2,069	2,162	2,084	2,023	1,901	1,773	1,700	-12.3
OTHER	12,500	12,527	12,772	13,912	15,851	16,150	17,564	18,872	20,379	22,360	78.9
SOCIAL SCIENCES	89,944	94,597	98,951	104,777	114,525	118,263	122,088	127,085	133,070	139,017	54.6
SOCIOLOGY	4,046	4,163	4,377	4,873	6,097	6,657	7,672	8,287	8,583	9,384	131.9
ECONOMICS	7,215	8,204	8,880	9,866	11,460	11,282	11,668	12,078	12,960	13,136	82.1
COMMERCE/MAN./BUS.	39,599	43,176	44,788	45,780	45,634	46,437	46,964	48,310	50,467	52,436	32.4
OTHER	39,084	39,054	40,906	44,258	51,334	53,887	55,784	58,410	61,060	64,061	63.9
AGRI./BIO. SCI.	19,006	18,527	19,139	20,873	24,396	26,007	27,374	28,196	28,247	27,848	46.5
BIOCHEMISTRY	1,511	1,507	1,567	1,817	2,447	2,658	3,029	3,185	3,305	3,250	115.1
BIOLOGY	8,134	7,935	8,460	9,518	11,876	13,230	14,135	15,009	15,172	15,071	85.3
VETERINARY MEDICINE	737	1,004	1,011	1,021	1,040	1,050	1,075	1,093	1,138	1,145	55.4
OTHER	8,624	8,081	8,101	8,517	9,033	9,069	9,135	8,909	8,632	8,382	-2.8
ENG./APPLIED SCI.	35,690	36,813	38,693	39,244	39,210	39,278	38,716	38,053	38,282	38,660	8.3
MECHANICAL ENG.	5,023	5,606	6,578	6,716	6,816	6,845	6,965	7,028	7,074	7,126	41.9
ELECTRICAL ENG.	5,669	6,031	7,156	7,414	7,841	7,996	8,043	7,507	7,515	7,590	33.9
ENG. GENERAL	7,160	7,550	5,931	5,437	5,165	5,245	5,810	5,777	5,836	5,888	-17.8
OTHER	17,838	17,626	19,028	19,677	19,388	19,192	17,898	17,741	17,857	18,056	1.2
HEALTH PROFESSIONS	21,231	21,651	21,999	22,440	23,216	23,866	23,987	24,212	24,511	24,810	16.9
REHABILITATION	2,255	2,345	2,341	2,514	2,540	2,632	2,859	3,119	3,270	3,443	52.7
NURSING	5,380	5,782	6,069	6,172	6,556	6,774	6,695	6,525	6,673	6,854	27.4
MEDICINE	7,393	7,402	7,456	7,489	7,374	7,287	7,216	7,163	7,011	6,978	-5.6
OTHER	6,203	6,122	6,133	6,265	6,746	7,173	7,217	7,405	7,557	7,535	21.5
MATH./PHYSICAL SCI.	18,872	22,242	26,438	28,717	31,106	28,650	27,064	25,161	24,681	24,441	29.5
CHEMISTRY	2,626	2,607	2,838	3,020	3,711	3,830	4,036	3,912	4,009	3,819	45.4
MATHEMATICS	6,254	7,051	7,629	8,199	9,044	8,782	8,989	8,803	8,720	8,797	40.7
GEOLOGY	2,325	2,891	3,315	3,221	2,943	2,397	1,997	1,580	1,254	1,170	-49.7
OTHER	7,667	9,693	12,656	14,277	15,408	13,641	12,042	10,866	10,698	10,655	39.0

FULL-TIME BACHELOR'S ENROLMENT BY FIELD AND DISCIPLINE



To illustrate enrolment trends at the bachelor's and first professional degree level in more detail, a maximum of three disciplines from each field were selected for analysis. Those chosen were prominent disciplines that experienced marked enrolment change.

In the early 1980s, some institutions classified all bachelor's students as general arts and sciences enrolment, except for those enroled in some professional programs. In 1984 a large institution began classifying these students in the appropriate fields. As a result, some fields were more affected than others and trends in bachelor's enrolment by field of study over the decade were distorted. However, fields with large and small growth can still be identified.

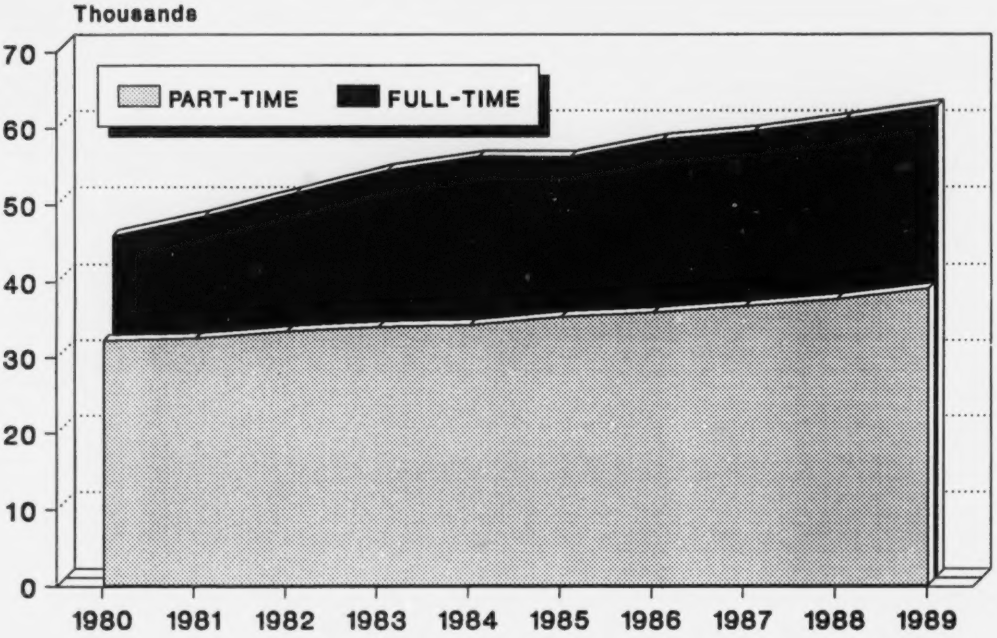
Humanities and social sciences were the two fastest growing fields. Enrolment in disciplines such as English language/literature and sociology more than doubled. Surprisingly, commerce/business/management had the slowest growth of the major social science disciplines, although it still accounted for almost 40% of all social science enrolment in 1989.

Overall, enrolment growth in science-related disciplines was somewhat erratic. In most disciplines, enrolment increased during the first half of the decade, but fluctuated after 1984. For example, enrolment in mathematics grew from 6,200 students in 1980 to 9,000 in 1984, but during the last half of the decade, stabilized at about 8,800 students. Geology also experienced rapid enrolment increases in the early 1980s, but by 1989, there was only one student enroled for every three in 1983. The trend was similar, but less drastic, in electrical engineering. However, enrolment in mechanical engineering, biochemistry and biology rose throughout the period, while in general engineering, the number of full-time students declined during the first half of the decade then stabilized. In the health professions, a relatively large increase in rehabilitation and a more modest upturn in nursing more than offset declines in medicine.

Graduate Enrolment
by Registration Status

	Full-time					**Part-time**				
	Master's	**Doctoral**	**Diploma and Certificate**	**Other**	**Total**	**Master's**	**Doctoral**	**Diploma and Certificate**	**Other**	**Total**
1980	25,802	9,947	1,306	7,610	44,665	22,665	3,362	2,507	3,568	32,102
1981	27,622	10,357	1,298	7,887	47,164	23,193	3,200	2,432	3,565	32,390
1982	29,472	11,228	1,395	8,080	50,175	23,783	3,292	2,346	3,914	33,335
1983	31,656	11,997	1,423	8,081	53,157	24,202	3,300	2,222	4,181	33,905
1984	32,451	12,900	1,448	8,087	54,886	24,503	3,237	2,521	3,865	34,126
1985	31,913	13,497	1,427	8,021	54,858	24,890	3,338	2,692	4,340	35,260
1986	33,029	14,351	1,623	8,147	57,150	24,878	3,369	3,542	4,013	35,802
1987	33,240	15,235	1,698	8,029	58,202	25,249	3,390	3,718	4,320	36,677
1988	33,866	16,318	1,676	7,983	59,843	25,902	3,444	4,014	4,277	37,637
1989	34,955	17,268	1,742	7,615	61,580	26,222	3,714	4,477	4,620	39,033
Annual Rate of Change										
	%	%	%	%	%	%	%	%	%	%
1981/1980	7.1	4.1	-0.6	3.6	5.6	2.3	-4.8	-3.0	-0.1	0.9
1982/1981	6.7	8.4	7.5	2.4	6.4	2.5	2.9	-3.5	9.8	2.9
1983/1982	7.4	6.8	2.0	0.0	5.9	1.8	0.2	-5.3	6.8	1.7
1984/1983	2.5	7.5	1.8	0.1	3.3	1.2	-1.9	13.5	-7.6	0.7
1985/1984	-1.7	4.6	-1.5	-0.8	-0.1	1.6	3.1	6.8	12.3	3.3
1986/1985	3.5	6.3	13.7	1.6	4.2	-0.0	0.9	31.6	-7.5	1.5
1987/1986	0.6	6.2	4.6	-1.4	1.8	1.5	0.6	5.0	7.7	2.4
1988/1987	1.9	7.1	-1.3	-0.6	2.8	2.6	1.6	8.0	-1.0	2.6
1989/1988	3.2	5.8	3.9	-4.6	2.9	1.2	7.8	11.5	8.0	3.7
Women as Proportion of Total Enrolment										
	%	%	%	%	%	%	%	%	%	%
1980	39.9	29.9	40.4	30.5	36.1	39.0	30.2	40.3	44.2	38.8
1981	41.1	31.0	40.1	32.0	37.3	40.6	31.5	43.7	46.5	40.6
1982	41.1	31.8	43.5	32.2	37.7	42.5	32.4	48.4	45.6	42.3
1983	40.7	32.4	44.9	32.8	37.8	43.9	33.7	53.3	48.3	44.1
1984	42.1	32.6	43.6	33.3	38.6	45.3	35.5	54.1	48.6	45.4
1985	43.4	33.2	46.7	34.9	39.7	46.2	37.3	54.5	48.9	46.3
1986	43.8	34.0	48.9	35.5	40.3	47.6	38.2	53.6	51.1	47.7
1987	43.6	34.8	51.1	36.8	40.6	49.3	39.1	56.7	54.4	49.7
1988	44.5	34.7	50.1	36.3	40.9	49.8	38.3	57.4	53.7	50.0
1989	45.0	34.8	48.8	37.1	41.3	50.8	39.0	56.9	52.7	50.6
International Students as Proportion of Total Enrolment										
	%	%	%	%	%	%	%	%	%	%
1980	14.9	24.7	11.6	13.7	16.8	2.4	9.5	0.6	5.0	3.3
1981	16.1	26.3	10.6	13.5	17.8	2.6	9.5	0.6	4.5	3.4
1982	15.0	27.5	11.4	12.8	17.3	2.5	7.6	0.8	5.0	3.2
1983	13.6	26.0	11.0	12.6	16.2	2.3	8.2	0.7	4.6	3.1
1984	13.2	25.0	10.7	12.3	15.8	2.1	8.2	0.9	5.0	2.9
1985	13.4	24.0	9.3	11.6	15.7	2.3	8.0	1.1	5.2	3.1
1986	13.2	23.6	11.2	12.3	15.6	2.2	9.1	0.9	5.0	3.0
1987	13.8	23.9	8.8	11.8	16.0	2.2	8.4	1.4	4.3	2.9
1988	15.0	27.3	12.2	12.1	17.9	2.3	7.8	1.7	5.4	3.1
1989	16.8	29.3	12.2	14.2	19.9	2.6	9.3	1.9	5.5	3.5

GRADUATE ENROLMENT BY REGISTRATION STATUS



The graduate level comprises four programs: master's, doctoral, certificate/diploma, and "other." The latter includes hospital interns and residents and programs that do not lead to a degree, diploma, or certificate. Close to 62,000 students were enroled in full-time graduate programs in 1989 -- up almost 38% from 44,000 in 1980.

Full-time master's enrolment grew by over 35% to 35,000 in 1989 from about 26,000 in 1980. Increases were rapid between 1980 and 1983, averaging 7% annually. After a decline in 1985, enrolment started growing again, but at a slower pace. By contrast, between 1980 and 1989, full-time doctoral enrolment increased steadily, rising over 73% from about 10,000 to more than 17,000.

At the same time, part-time graduate enrolment rose 21.5% to 39,000 in 1989 from 32,000 in 1980. Growth was most rapid in diploma/certificate programs: up 78%.

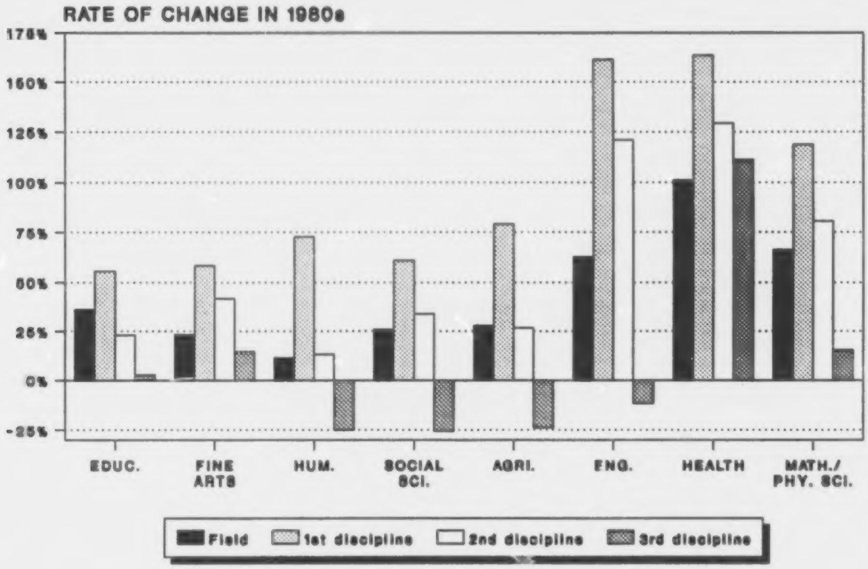
Women accounted for 41% of full-time graduate enrolment in 1989 versus only 36% in 1980. As well, the number of women enroled part time in graduate programs grew even faster than the number studying full time. In fact, the number of women in part-time studies exceeded 50% of part-time enrolment in 1989, compared with 38% nine years earlier.

At the graduate level, international students tend to be enroled in full-time programs. Their share of all full-time graduate enrolment grew from 17% in 1980 to 20% in 1989. Moreover, by 1989, they accounted for 29% of full-time doctoral enrolment. Their representation had risen until 1982, but had fallen in the middle of the decade to 24%. Since then, the proportion of international students among full-time doctoral students has grown.

Full-Time Master's Enrolment by Field and Discipline

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Rate of Change During Decade %
GENERAL ARTS/SCIENCES	44	75	130	204	197	177	112	101	78	64	45.5
EDUCATION/RECREATION	2,711	3,055	3,273	3,292	3,321	3,246	3,398	3,360	3,510	3,693	36.2
NON-TEACHING FIELDS	1,325	1,696	1,818	1,647	1,617	1,613	1,753	1,646	1,792	2,060	55.5
PHYSICAL EDUCATION	327	394	393	424	440	474	439	393	533	403	23.2
ELEMENTARY/SECONDARY	891	834	909	1,032	1,082	957	1,001	994	857	917	2.9
OTHER	168	131	153	189	182	202	205	327	328	313	86.3
FINE & APPLIED ARTS	824	874	894	943	931	953	997	1,047	1,041	1,016	23.3
APPLIED ARTS	91	110	127	122	97	143	126	140	131	144	58.2
OTHER PERFORMING ARTS	96	102	108	111	80	92	115	145	132	136	41.7
MUSIC	330	333	326	365	377	336	370	392	370	378	14.5
OTHER	307	329	333	345	377	382	386	370	408	358	16.6
HUMANITIES	4,372	4,443	4,538	4,585	4,744	4,664	4,755	4,714	4,883	4,876	11.5
JOURNALISM	59	52	45	49	55	54	59	62	75	102	72.9
PHILOSOPHY	355	422	428	391	407	363	363	360	379	402	13.2
TRANSLATION/INTERPRETATION	120	128	157	133	164	139	124	101	113	90	-25.0
OTHER	3,838	3,841	3,908	4,012	4,118	4,108	4,209	4,191	4,316	4,282	11.6
SOCIAL SCIENCES	9,945	10,585	11,109	11,352	11,584	11,486	12,042	12,049	11,975	12,528	26.0
SPECIALIZED ADMINISTRATION	375	365	390	376	359	496	566	603	604	603	60.8
COMMERCE/MAN./BUS.	3,527	3,766	4,104	4,068	4,085	4,071	4,421	4,659	4,412	4,723	33.9
OTHER AREA STUDIES	110	117	115	122	69	71	80	71	90	82	-25.5
OTHER	5,933	6,337	6,500	6,786	7,071	6,848	6,975	6,716	6,869	7,120	20.0
AGRI./BIO. SCI.	1,959	1,983	2,109	2,327	2,374	2,432	2,467	2,507	2,543	2,507	28.0
VETERINARY SCIENCES	67	62	75	74	77	71	80	93	118	120	79.1
BIOLOGY	726	726	726	844	885	946	961	932	949	920	26.7
ZOOLOGY	296	310	304	296	311	291	261	248	251	226	-23.6
OTHER	870	885	1,004	1,113	1,101	1,124	1,165	1,234	1,225	1,241	42.6
ENG./APPLIED SCI.	2,628	2,843	3,392	4,197	4,205	3,822	3,945	3,973	4,051	4,270	62.5
MECHANICAL ENG.	254	300	448	633	634	523	545	599	593	664	161.4
ELECTRICAL ENG.	507	563	688	905	915	918	973	994	1,054	1,121	121.1
ENG. GENERAL	130	141	101	133	110	76	80	75	106	115	-11.5
OTHER	1,737	1,839	2,155	2,526	2,546	2,305	2,347	2,305	2,298	2,370	36.4
HEALTH PROFESSIONS	1,389	1,507	1,578	1,839	2,001	2,178	2,252	2,354	2,671	2,791	100.9
MEDICAL SPECIALITIES	96	90	85	104	125	145	168	164	229	253	163.5
BASIC MEDICAL SCIENCES	408	465	485	564	679	716	750	832	961	937	129.7
NURSING	188	203	216	265	323	377	371	365	364	397	111.2
OTHER	697	749	792	906	874	940	963	993	1,117	1,204	72.7
MATH./PHYSICAL SCI.	1,930	2,257	2,449	2,917	3,094	2,955	3,061	3,135	3,114	3,210	66.3
COMPUTER SCIENCE	388	487	623	709	779	773	798	818	821	849	118.8
MATHEMATICS	286	352	361	413	387	379	435	491	483	516	80.4
GEOLOGY	402	431	495	618	647	591	538	513	478	464	15.4
OTHER	854	987	970	1,177	1,281	1,212	1,290	1,313	1,332	1,381	61.7

FULL-TIME MASTER'S ENROLMENT BY FIELD AND DISCIPLINE



To more fully demonstrate trends in full-time master's enrolment, a maximum of three disciplines from each field were selected for analysis. Those chosen were disciplines that experienced marked change and had relatively substantial enrolment.

In education and recreation, enrolment grew 36% over the decade. Most of this growth was due to higher enrolment in non-teaching disciplines. By contrast, enrolment in the traditional area of education, elementary/secondary teacher training, declined in the latter part of the decade after growing during the first half of the 1980s.

Enrolment growth was somewhat erratic in commerce/business/management. Overall, enrolment increased almost 34% during the 1980s, but most of this growth occurred at the beginning and end of the decade. Nonetheless, this discipline remained the first choice of students enroled in the social sciences.

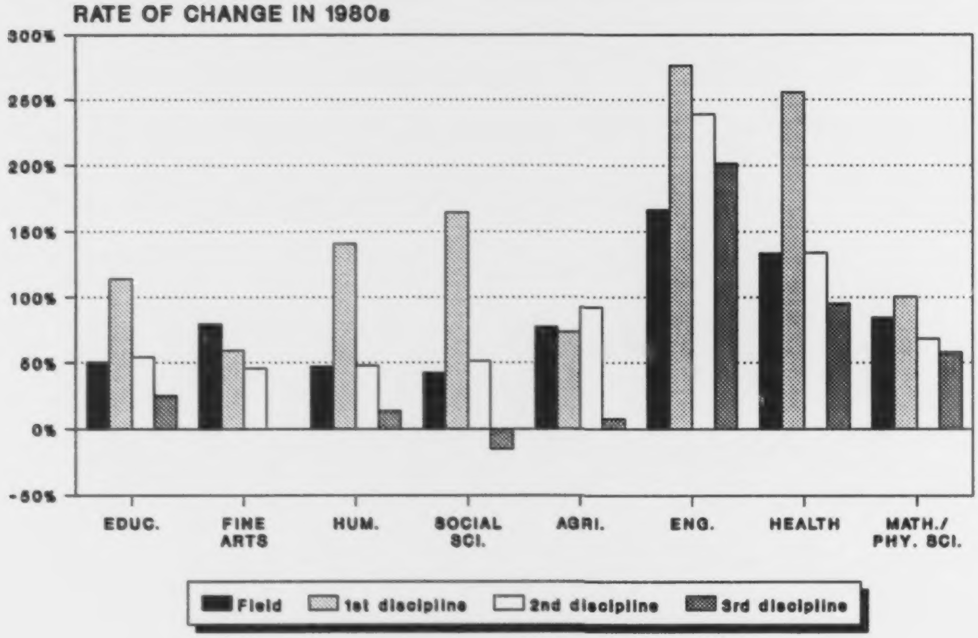
Master's enrolment in science-related disciplines, except agricultural/biological sciences, increased considerably, compared with non-scientific fields. In fact, enrolment in computer science and engineering disciplines (except general engineering) more than doubled between 1980 and 1989.

Enrolment in health professions also increased significantly during the 1980s, with the number of students in medical specialties, basic medical sciences, and nursing more than doubling.

Full-Time Doctoral Enrolment
by Field and Discipline

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Rate of Change During Decade %
GENERAL ARTS/SCIENCES	31	45	86	134	168	161	121	138	153	134	332.3
EDUCATION/RECREATION	983	1,020	1,019	1,094	1,206	1,172	1,279	1,381	1,425	1,478	50.4
HIGHER EDUC./POSTSEC.	21	25	39	43	41	39	38	30	37	45	114.3
NON-TEACHING FIELDS	665	704	687	773	826	824	890	960	998	1,025	54.1
ELEMENTARY/SECONDARY	231	214	207	200	247	210	228	275	262	289	25.1
OTHER	66	77	86	78	92	99	123	116	128	119	80.3
FINE/APPLIED ARTS	97	90	96	105	109	118	127	134	161	174	79.4
MUSIC	54	44	54	60	60	63	69	70	87	86	59.3
OTHER PERFORMING ARTS	35	38	33	34	33	35	37	42	40	51	45.7
OTHER	8	8	9	11	16	20	21	22	34	37	362.5
HUMANITIES	1,913	1,928	1,964	1,984	2,197	2,233	2,358	2,497	2,669	2,812	47.0
RELIGIOUS STUDY	108	115	117	127	163	159	178	173	194	260	140.7
LANGUAGES/LIT.	257	254	269	239	323	316	322	347	356	380	47.9
ENGLISH LANG./LIT.	494	503	502	518	481	489	521	543	569	561	13.6
OTHER	1,054	1,056	1,076	1,100	1,230	1,269	1,337	1,434	1,550	1,611	52.8
SOCIAL SCIENCES	2,646	2,736	2,938	3,071	3,122	3,246	3,324	3,482	3,702	3,762	42.2
COMMERCE/MAN./BUS.	144	164	203	237	259	301	324	338	369	381	164.6
PSYCHOLOGY	859	898	946	1,042	1,123	1,178	1,199	1,219	1,257	1,298	51.1
ECONOMICS	498	505	430	430	402	360	371	392	407	423	-15.1
OTHER	1,145	1,169	1,359	1,362	1,338	1,407	1,430	1,533	1,669	1,660	45.0
AGRI./BIO. SCI.	1,077	1,147	1,232	1,365	1,428	1,514	1,621	1,686	1,797	1,913	77.6
AGRICULTURE	241	275	306	348	363	378	390	392	434	464	92.5
BIOLOGY	400	421	465	487	503	518	597	622	659	695	73.7
ZOOLOGY	212	206	204	220	197	201	202	214	225	228	7.5
OTHER	292	267	384	307	275	310	241	305	351	273	-6.5
ENG./APPLIED SCI.	915	966	1,162	1,363	1,561	1,674	1,848	1,968	2,179	2,440	166.7
MECHANICAL ENG.	106	117	156	183	209	213	254	297	337	399	276.4
CIVIL ENGINEERING	131	174	209	269	289	303	311	334	380	444	238.9
ELECTRICAL ENG.	206	226	297	346	422	432	487	481	536	622	201.9
OTHER	472	449	500	565	641	726	796	856	926	975	106.6
HEALTH PROFESSIONS	679	748	853	894	978	1,076	1,196	1,331	1,439	1,586	133.6
MEDICAL SPECIALITIES	72	82	99	121	141	162	176	211	219	256	255.6
PARACLINICAL SCI.	94	101	133	133	133	138	141	181	184	220	134.0
BASIC MEDICAL SCI.	410	450	470	466	509	565	640	676	743	801	95.4
OTHER	103	115	151	174	195	211	239	263	293	309	200.0
MATH./PHYSICAL SCI.	1,606	1,677	1,878	1,987	2,131	2,303	2,477	2,618	2,793	2,969	84.9
MATHEMATICS	250	255	264	298	329	365	365	403	413	501	100.4
PHYSICS	386	387	436	458	481	502	567	576	630	651	68.7
CHEMISTRY	594	630	711	737	765	821	842	862	927	940	58.2
OTHER	376	405	467	494	556	615	703	777	823	877	133.2

FULL-TIME DOCTORAL ENROLMENT BY FIELD AND DISCIPLINE



To illustrate enrolment trends at the doctoral level, a maximum of three disciplines were analysed in each field of study: the two with the highest increases during the decade and the one with the sharpest drop or the smallest increase. As well, the disciplines selected had to have relatively substantial enrolment.

In the social sciences, the disciplines with the most significant increases were commerce/business/management and psychology. Enrolment in the former rose almost 165%, the highest increase among the humanities and social sciences. On the other hand, doctoral enrolment in many other non-scientific disciplines alternated periods of growth and decline.

By contrast, among the science-related disciplines, full-time doctoral enrolment growth was strong and steady. Enrolment in the selected engineering/applied science disciplines increased threefold between 1980 and 1989. Similarly, the number of students in mathematics doubled, while the number in physics and chemistry went up by over 50%.

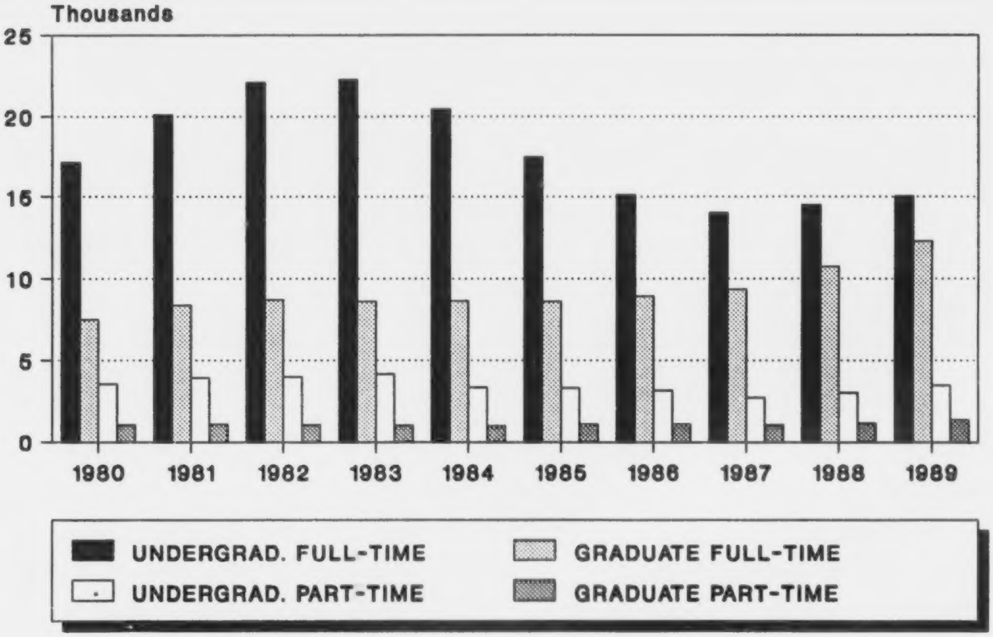
Full-time doctoral enrolment in the health professions also grew substantially and steadily during the 1980s. The number of students in medical specialties more than tripled while those in paraclinical sciences and basic medical specialties rose by 134% and 95%, respectively.

International Students
by Registration Status and Program

FULL-TIME

	Undergraduate				Graduate				
	Bachelor's and First Professional	Diploma and Certificate	Other	Total	Master's	Doctoral	Diploma and Certificate	Other	Total
1980	16,058	393	677	17,128	3,833	2,459	151	1,041	7,484
1981	18,927	413	772	20,112	4,450	2,726	138	1,065	8,379
1982	20,918	472	685	22,075	4,426	3,086	159	1,031	8,702
1983	21,168	508	575	22,251	4,298	3,125	157	1,019	8,599
1984	19,405	467	588	20,460	4,281	3,226	155	996	8,658
1985	16,521	363	581	17,465	4,288	3,239	132	932	8,591
1986	14,120	356	650	15,126	4,355	3,390	182	1,001	8,928
1987	12,927	428	650	14,005	4,592	3,643	150	945	9,330
1988	13,196	475	827	14,498	5,082	4,455	204	966	10,707
1989	13,643	469	924	15,036	5,888	5,058	213	1,080	12,239
Annual Rate of Change									
	%	%	%	%	%	%	%	%	%
1981/1980	17.9	5.1	14.0	17.4	16.1	10.9	-8.6	2.3	12.0
1982/1981	10.5	14.3	-11.3	9.8	-0.5	13.2	15.2	-3.2	3.9
1983/1982	1.2	7.6	-16.1	0.8	-2.9	1.3	-1.3	-1.2	-1.2
1984/1983	-8.3	-8.1	2.3	-8.0	-0.4	3.2	-1.3	-2.3	0.7
1985/1984	-14.9	-22.3	-1.2	-14.6	0.2	0.4	-14.8	-6.4	-0.8
1986/1985	-14.5	-1.9	11.9	-13.4	1.6	4.7	37.9	7.4	3.9
1987/1986	-8.4	20.2	0.0	-7.4	5.4	7.5	-17.6	-5.6	4.5
1988/1987	2.1	11.0	27.2	3.5	10.7	22.3	36.0	2.2	14.8
1989/1988	3.4	-1.3	11.7	3.7	15.9	13.5	4.4	11.8	14.3
PART-TIME									
1980	2,194	184	1,182	3,560	543	321	16	178	1,058
1981	2,626	135	1,169	3,930	609	305	15	161	1,090
1982	2,534	100	1,356	3,990	588	250	19	195	1,052
1983	2,844	132	1,207	4,183	555	272	16	192	1,035
1984	2,374	151	816	3,341	510	265	22	195	992
1985	2,458	121	745	3,324	568	268	30	225	1,091
1986	2,196	154	821	3,171	554	307	31	199	1,091
1987	1,728	186	803	2,717	546	286	51	184	1,067
1988	1,836	221	983	3,040	607	269	69	230	1,175
1989	2,027	244	1,220	3,491	691	347	84	256	1,378
Annual Rate of Change									
	%	%	%	%	%	%	%	%	%
1981/1980	19.7	-26.6	-1.1	10.4	12.2	-5.0	-6.3	-9.6	3.0
1982/1981	-3.5	-25.9	16.0	1.5	-3.4	-18.0	26.7	21.1	-3.5
1983/1982	12.2	32.0	-11.0	4.8	-5.6	8.8	-15.8	-1.5	-1.6
1984/1983	-16.5	14.4	-32.4	-20.1	-8.1	-2.6	37.5	1.6	-4.2
1985/1984	3.5	-19.9	-8.7	-0.5	11.4	1.1	36.4	15.4	10.0
1986/1985	-10.7	27.3	10.2	-4.6	-2.5	14.6	3.3	-11.6	0.0
1987/1986	-21.3	20.8	-2.2	-14.3	-1.4	-6.8	64.5	-7.5	-2.2
1988/1987	6.3	18.8	22.4	11.9	11.2	-5.9	35.3	25.0	10.1
1989/1988	10.4	10.4	24.1	14.8	13.8	29.0	21.7	11.3	17.3

INTERNATIONAL STUDENTS BY LEVEL AND REGISTRATION STATUS



During the 1980s, most international students attending Canadian universities were enroled full time. On average, the full-time/part-time ratio was 5:1 for international undergraduates; for those pursuing graduate studies, the ratio was even higher, 8:1.

Overall, the number of full-time international students at the undergraduate level declined 12% to 15,000 in 1989 from 17,100 in 1980. The biggest drop occurred in bachelor's and first professional degree programs where enrolment fell 15% to 13,600 from 16,100. Numbers, however, had peaked at 21,200 in 1983 and then fell below 13,000 by 1987. Much of this pattern was attributable to a sharp decline in the number of undergraduates from Malaysia and Hong Kong. These students accounted for almost half of all full-time international undergraduate enrolment in 1983 and 1984, but only about one third in the latter part of the decade.

Trends at the graduate level were much different, as the number of international students rose almost steadily throughout the 1980s. Full-time enrolment in graduate programs rose 64% from 7,500 in 1980 to 12,200 in 1989: master's enrolment grew by nearly 54%, and doctoral enrolment doubled.

The pattern of part-time international undergraduate enrolment resembled that of full-time enrolment. Numbers peaked at 4,200 in 1983 and then dropped to 2,700 in 1987. However, an upturn thereafter brought 1989 enrolment almost to the 1980 level.

In graduate studies, despite minor fluctuations, part-time enrolment grew by more than 30% between 1980 and 1989. This increase was mainly due to growth at the end of the decade.

Full-time International Students
by Level and Field

Bachelor's and First Professional

	FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6	FIELD 7	FIELD 8	FIELD 9	TOTAL
1980	4,354	337	296	579	4,325	646	3,197	308	1,818	15,860
1981	4,955	394	296	696	5,497	671	3,313	311	2,626	18,759
1982	5,217	414	296	804	6,254	766	3,119	299	3,588	20,757
1983	4,729	394	295	852	6,755	734	2,803	311	4,136	21,009
1984	2,985	291	264	934	6,516	791	2,477	261	4,734	19,253
1985	2,426	314	240	820	5,652	741	2,149	269	3,738	16,349
1986	1,955	239	226	802	4,886	731	1,965	249	2,871	13,924
1987	1,761	276	218	856	4,596	656	1,897	226	2,179	12,665
1988	2,048	332	260	912	4,762	617	1,852	246	1,900	12,930
1989	2,187	328	295	940	4,898	588	1,941	277	1,893	13,347
Master's										
1980	9	233	63	413	1,183	258	913	128	532	3,732
1981	17	287	67	468	1,234	296	1,066	149	678	4,262
1982	29	280	56	401	1,182	358	1,201	183	702	4,392
1983	24	249	55	370	1,078	367	1,171	223	729	4,266
1984	14	253	45	377	1,111	357	1,076	230	717	4,180
1985	10	257	44	424	1,129	358	1,017	231	647	4,117
1986	8	265	45	419	1,116	373	1,021	232	710	4,189
1987	4	280	59	392	1,114	424	1,073	242	749	4,337
1988	19	326	61	450	1,297	472	1,322	294	839	5,079
1989	8	331	63	468	1,538	501	1,613	357	1,008	5,886
Doctoral										
1980	3	146	11	350	645	261	378	108	557	2,459
1981	5	153	12	379	684	280	484	128	601	2,726
1982	9	161	12	378	735	312	636	157	686	3,086
1983	11	162	13	345	732	325	703	164	670	3,125
1984	10	176	14	386	642	347	782	181	688	3,226
1985	9	165	12	356	602	355	787	202	751	3,239
1986	13	162	10	365	581	380	844	227	808	3,390
1987	19	184	9	374	611	412	887	261	886	3,643
1988	41	227	13	458	721	519	1,080	319	1,077	4,455
1989	19	264	15	532	768	589	1,255	384	1,232	5,058

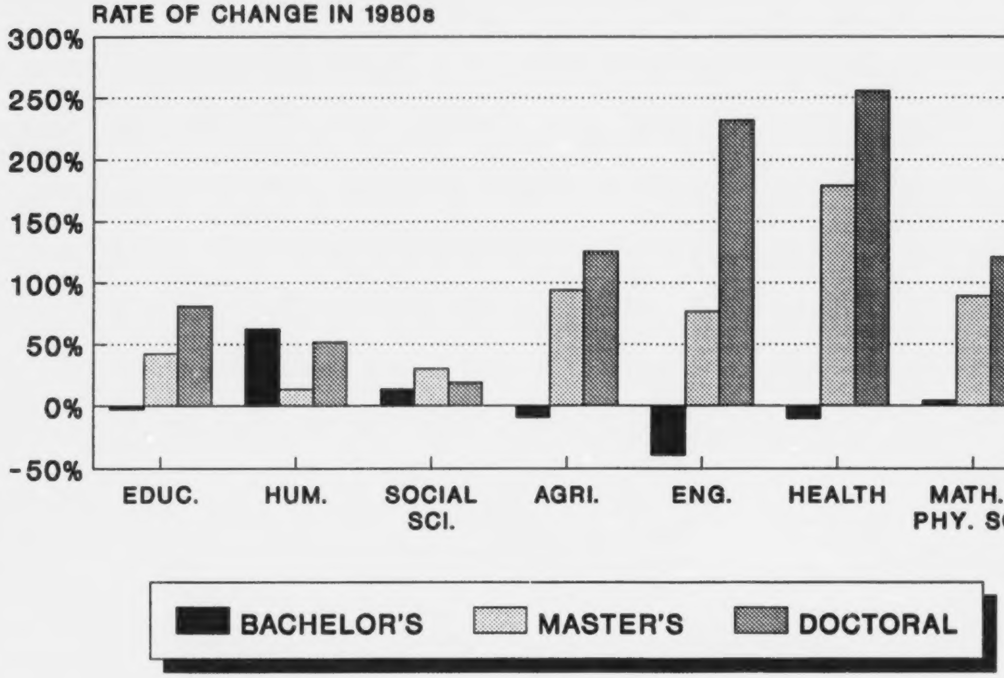
Rate of Change During Decade

	%	%	%	%	%	%	%	%	%	%
Bachelor's	-50	-3	-0	62	13	-9	-39	-10	4	-16
Master's	-11	42	-0	13	30	94	77	179	89	58
Doctoral	533	81	36	52	19	126	232	256	121	106

LEGEND - FIELDS OF STUDY

1 - General Arts/Sciences
2 - Education/Recreation
3 - Fine/Applied Arts
4 - Humanities
5 - Social Sciences
6 - Agriculture/ Biological Sciences
7 - Engineering/Applied Sciences
8 - Health Professions
9 - Mathematics/Physical Sciences

FULL-TIME INTERNATIONAL STUDENTS BY LEVEL AND BY FIELD OF STUDY



The overall trends in the full-time enrolment of international students that characterized the undergraduate and graduate levels tended to prevail in most fields of study. That is, increases in bachelor's enrolment early in the decade were more than offset by large declines in the middle of the decade while enrolment in master's and PhD programs grew throughout the decade.

At the bachelor's level, after reaching a high in the mid-1980s, full-time international enrolment in most fields dropped sharply and then started to rise again. This was the pattern in education/recreation, humanities, and social sciences. There were, however, some exceptions. For example, mathematics/physical sciences declined steadily throughout the last half of the 1980s.

At the master's level, the social sciences, engineering/applied sciences, and mathematics/physical sciences attracted the most international students. The most significant growth during the 1980s, however, was in science-related disciplines. For instance, enrolment in mathematics/physical sciences almost doubled. And whereas the social sciences had the most international students enroled full time in master's programs in 1980, by 1989 these fields ranked second behind engineering and applied sciences.

The number of international students enroled full time in doctoral programs doubled over the decade from 2,500 in 1980 to slightly over 5,000 in 1989. Enrolment in engineering/applied sciences and the health professions more than tripled, while the number in mathematics/physical sciences and agriculture/biological sciences doubled. By contrast, enrolment in education, the humanities, and the social sciences was relatively stable between 1980 and 1987, but grew substantially at the end of the decade.

Full-Time Enrolment
by Level and Field

Bachelor's and First Professional

	FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6	FIELD 7	FIELD 8	FIELD 9	TOTAL
1980	64,284	34,766	11,256	22,422	89,944	19,006	35,690	21,231	18,872	317,471
1981	68,125	35,860	11,705	22,494	94,597	18,527	36,813	21,651	22,242	332,014
1982	73,856	36,581	12,068	23,374	98,951	19,139	38,693	21,999	26,438	351,099
1983	78,413	38,122	12,784	25,613	104,777	20,873	39,244	22,440	28,717	370,983
1984	65,770	38,330	13,116	30,270	114,525	24,396	39,210	23,216	31,106	379,939
1985	66,865	39,071	13,487	31,165	118,263	26,007	39,278	23,866	28,650	386,652
1986	63,671	40,375	13,840	33,495	122,088	27,374	38,716	23,987	27,064	390,610
1987	65,616	41,549	14,026	36,282	127,085	28,196	38,053	24,212	25,161	400,180
1988	68,028	42,423	14,062	38,934	133,070	28,247	38,282	24,511	24,681	412,238
1989	68,801	45,034	14,415	42,607	139,017	27,848	38,660	24,810	24,441	425,633
Master's										
1980	44	2,711	824	4,372	9,945	1,959	2,628	1,389	1,930	25,802
1981	75	3,055	874	4,443	10,585	1,983	2,843	1,507	2,257	27,622
1982	130	3,273	894	4,538	11,109	2,109	3,392	1,578	2,449	29,472
1983	204	3,292	943	4,585	11,352	2,327	4,197	1,839	2,917	31,656
1984	197	3,321	931	4,744	11,584	2,374	4,205	2,001	3,094	32,451
1985	177	3,246	953	4,664	11,486	2,432	3,822	2,178	2,955	31,913
1986	112	3,398	997	4,755	12,042	2,467	3,945	2,252	3,061	33,029
1987	101	3,360	1,047	4,714	12,049	2,507	3,973	2,354	3,135	33,240
1988	78	3,510	1,041	4,883	11,975	2,543	4,051	2,671	3,114	33,866
1989	64	3,693	1,016	4,876	12,528	2,507	4,270	2,791	3,210	34,955
Doctoral										
1980	31	983	97	1,913	2,646	1,077	915	679	1,606	9,947
1981	45	1,020	90	1,928	2,736	1,147	966	748	1,677	10,357
1982	86	1,019	96	1,964	2,938	1,232	1,162	853	1,878	11,228
1983	134	1,094	105	1,984	3,071	1,365	1,363	894	1,987	11,997
1984	168	1,206	109	2,197	3,122	1,428	1,561	978	2,131	12,900
1985	161	1,172	118	2,233	3,246	1,514	1,674	1,076	2,303	13,497
1986	121	1,279	127	2,358	3,324	1,621	1,848	1,196	2,477	14,351
1987	138	1,381	134	2,497	3,482	1,686	1,968	1,331	2,618	15,235
1988	153	1,425	161	2,669	3,702	1,797	2,179	1,439	2,793	16,318
1989	134	1,478	174	2,812	3,762	1,913	2,440	1,586	2,969	17,268

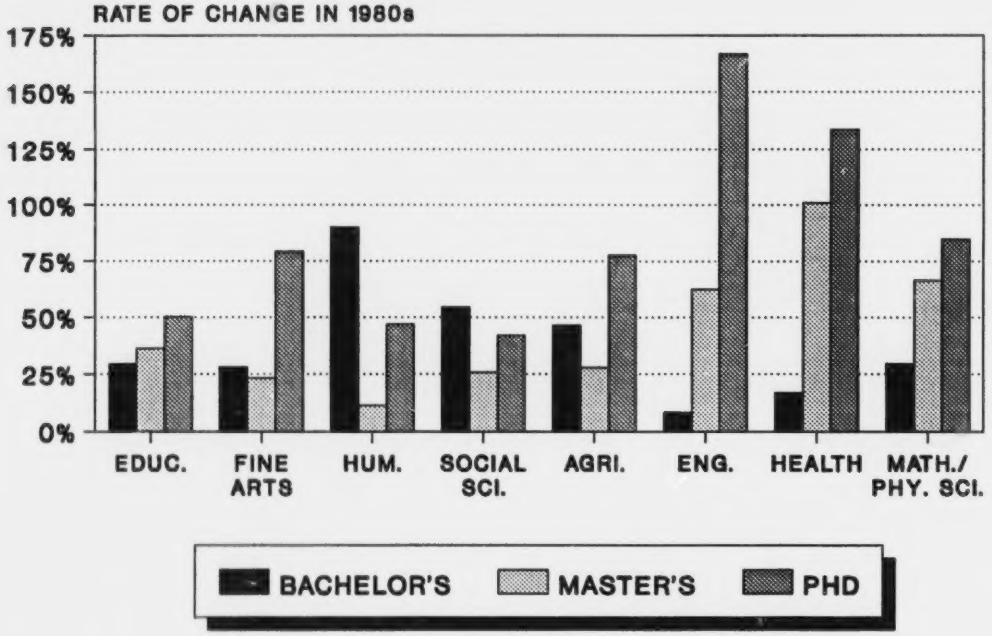
Rate of Change During Decade

	%	%	%	%	%	%	%	%	%	%
Bachelor's	7.0	29.5	28.1	90.0	54.6	46.5	8.3	16.9	29.5	34.1
Master's	45.5	36.2	23.3	11.5	26.0	28.0	62.5	100.9	66.3	35.5
Doctoral	332.3	50.4	79.4	47.0	42.2	77.6	166.7	133.6	84.9	73.6

LEGEND - FIELDS OF STUDY

1 - General Arts/Sciences
2 - Education/Recreation
3 - Fine/Applied Arts
4 - Humanities
5 - Social Sciences
6 - Agriculture/
Biological Sciences
7 - Engineering/Applied Sciences
8 - Health Professions
9 - Mathematics/Physical Sciences

FULL-TIME ENROLMENT
BY LEVEL AND FIELD



During the 1980s, full-time enrolment increased at all levels of study: bachelor's (34%); master's (35%); and doctoral (74%). However, growth varied in different major fields of study.

In the early 1980s, some institutions classified all bachelor's students as general arts and sciences enrolment, except for those enroled in some professional programs. In 1984 a large institution began classifying these students in the appropriate fields. As a result, some fields were more affected than others and trends in bachelor's enrolment by field of study over the decade were distorted. However, fields with large and small growth can still be identified. The social sciences and humanities were the fastest growing fields, while enrolment in engineering/applied sciences and mathematics/physical sciences was smaller in 1989 than in 1984.

At the master's level, the most notable increase occurred in science-related fields. During the decade, enrolment in the health professions doubled, while the number of students in engineering/applied sciences and mathematics/physical sciences rose by over 60%. The science-related field with the least enrolment growth was agricultural/biological sciences, where the increase was only 28%.

Doctoral enrolment increased substantially in all fields throughout the 1980s. But at this level, too, growth was most rapid in science-related fields. For instance, the number of students in engineering/applied sciences and the health professions more than doubled, while those in mathematics/physical sciences and agricultural/biological sciences almost doubled. As a result, science-related disciplines accounted for 52% of all doctoral enrolment in 1989, compared with 42% in 1980. Nonetheless, during the same period, doctoral enrolment in all fields in the social sciences and humanities grew by at least 40%.

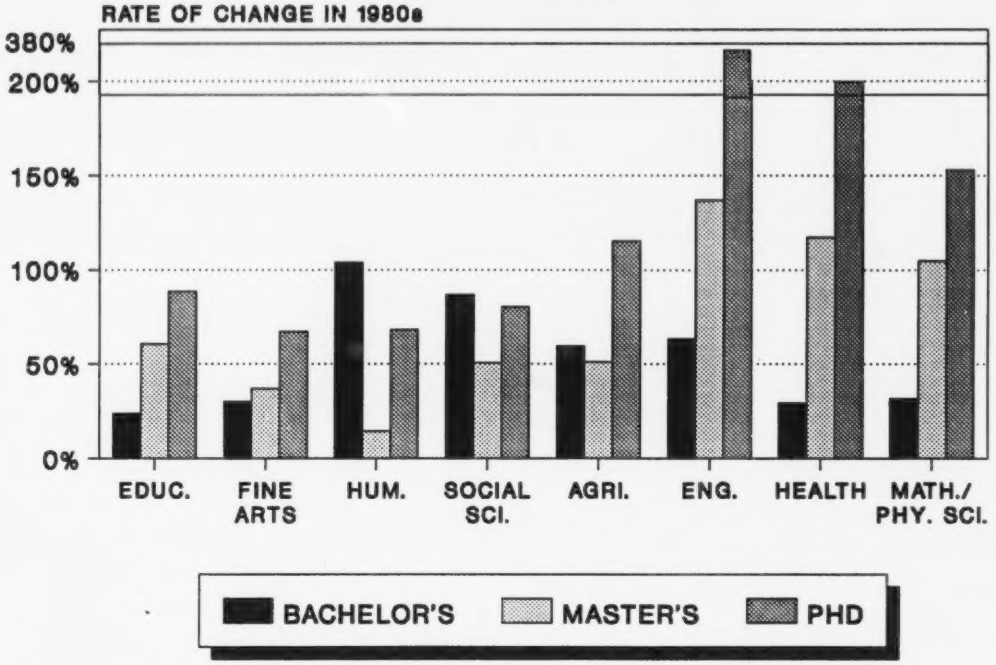
Full-Time Female Enrolment
by Level and Field

	FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6	FIELD 7	FIELD 8	FIELD 9	TOTAL
Bachelor's and First Professional										
1980	31,623	24,064	6,858	12,882	39,007	10,105	3,503	12,763	5,289	146,094
1981	33,910	24,978	7,221	13,172	41,889	10,135	3,989	13,382	6,234	154,910
1982	36,677	25,170	7,380	13,617	45,296	10,605	4,463	13,872	7,341	164,421
1983	39,171	25,886	7,649	14,893	49,587	11,717	4,679	14,459	8,024	176,065
1984	33,390	25,820	7,806	17,905	56,074	13,663	4,783	15,066	8,576	183,083
1985	34,314	25,885	8,099	18,696	58,840	14,745	4,920	15,686	7,793	188,978
1986	33,444	26,561	8,284	20,028	61,355	15,451	5,001	15,758	7,369	193,251
1987	34,860	27,216	8,465	21,924	64,534	15,912	5,100	15,910	7,014	200,935
1988	37,009	27,781	8,594	23,690	68,644	16,083	5,430	16,253	6,883	210,367
1989	37,855	29,823	8,921	26,250	72,841	16,120	5,726	16,493	6,968	220,997
Master's										
1980	19	1,504	432	2,319	3,773	794	278	795	378	10,292
1981	34	1,738	472	2,356	4,277	813	299	871	480	11,340
1982	61	1,896	469	2,517	4,520	837	370	919	522	12,111
1983	69	1,924	489	2,552	4,744	932	470	1,093	620	12,893
1984	72	2,069	527	2,673	4,936	1,004	487	1,214	681	13,663
1985	87	2,070	547	2,610	4,950	1,081	458	1,377	675	13,855
1986	63	2,203	555	2,658	5,269	1,092	508	1,418	707	14,473
1987	54	2,178	590	2,615	5,248	1,107	553	1,445	709	14,499
1988	47	2,316	593	2,684	5,399	1,159	585	1,596	707	15,086
1989	28	2,421	592	2,656	5,688	1,202	658	1,727	774	15,746
Doctoral										
1980	13	463	55	766	924	278	52	222	202	2,975
1981	18	489	45	801	1,010	301	67	252	232	3,215
1982	35	512	48	844	1,140	327	84	300	283	3,573
1983	47	572	50	866	1,223	386	102	334	309	3,889
1984	51	610	47	969	1,307	433	113	352	324	4,206
1985	53	624	56	993	1,401	458	125	406	359	4,475
1986	49	719	62	1,083	1,471	487	154	462	389	4,876
1987	54	766	68	1,165	1,562	518	175	535	459	5,302
1988	59	822	77	1,245	1,615	551	203	594	491	5,657
1989	66	873	92	1,288	1,668	598	249	665	511	6,010
Rate of Change During Decade										
	%	%	%	%	%	%	%	%	%	%
Bachelor's	19.7	23.9	30.1	103.8	86.7	59.5	63.5	29.2	31.7	51.3
Master's	47.4	61.0	37.0	14.5	50.8	51.4	136.7	117.2	104.8	53.0
Doctoral	407.7	88.6	67.3	68.1	80.5	115.1	378.8	199.5	153.0	102.0

LEGEND - FIELDS OF STUDY

1 - General Arts/Sciences
2 - Education/Recreation
3 - Fine/Applied Arts
4 - Humanities
5 - Social Sciences
6 - Agriculture/
Biological Sciences
7 - Engineering/Applied Sciences
8 - Health Professions
9 - Mathematics/Physical Sciences

FULL-TIME FEMALE ENROLMENT BY LEVEL AND FIELD



The number of women enroled in Canadian universities increased during the 1980s in all programs and fields of study. At the bachelor's and master's levels, enrolment grew by over 50%, while the number of women seeking doctoral degrees doubled. However, the proportion of female students varied in different fields and levels of study.

Female enrolment in bachelor's and first professional degree programs grew faster in some fields than in others. For instance, in humanities and social sciences, the number of women rose over 100% and 86%, respectively. Increases in the number of women enroled were also above average in some science-related fields such as engineering/applied sciences and agricultural/biological sciences.

At the master's level, the greatest growth of female enrolment was in science-related fields. In fact, the number of women enroled in engineering/applied sciences, the health professions, and mathematics/physical sciences more than doubled. The exception to this general trend was agricultural/biological sciences, in which growth was below the average.

Growth was particularly strong at the doctoral level. The number of women in engineering/applied sciences more than quadrupled, while the number in the health professions almost tripled. Despite these substantial increases, in 1989, women accounted for just 22% of doctoral enrolment in science-related fields and in engineering/applied sciences, their representation amounted to only 10%. By contrast, in 1989, about 45% of doctoral students in social sciences and humanities were women.

Participation Rates
by Sex and Age Group in University

Enrolment

	MALE			FEMALE			TOTAL		
	18-21	22-24	25-39	18-21	22-24	25-39	18-21	22-24	25-39
1980	99,685	53,207	37,690	98,565	34,714	25,784	198,250	87,921	63,474
1981	102,067	54,203	39,418	102,854	37,249	28,525	204,921	91,452	67,943
1982	107,194	56,515	42,796	108,857	39,685	30,550	216,052	96,200	73,346
1983	110,611	60,965	46,629	116,152	43,684	33,098	226,763	104,649	79,727
1984	110,655	62,453	48,371	118,936	46,488	35,925	229,592	108,940	84,296
1985	109,143	64,537	49,330	120,848	49,425	37,973	229,992	113,962	87,304
1986	107,266	66,718	51,431	121,042	53,125	40,954	228,308	119,843	92,386
1987	108,896	66,666	52,265	125,986	54,784	42,481	234,882	121,450	94,746
1988	111,102	65,822	52,776	132,054	55,687	44,118	243,156	121,510	96,894
1989	114,242	64,352	53,159	139,109	56,942	46,031	253,352	121,294	99,191

Population

1980	953,300	684,100	2,839,200	934,800	682,900	2,824,900	1,888,100	1,367,000	5,664,100
1981	963,100	693,700	2,927,600	942,100	695,600	2,917,600	1,905,200	1,389,300	5,845,200
1982	962,500	703,300	3,012,500	937,900	703,300	3,010,400	1,900,400	1,406,600	6,022,900
1983	948,000	710,300	3,081,500	922,700	709,000	3,087,500	1,870,700	1,419,300	6,169,000
1984	917,700	711,300	3,143,000	893,300	708,600	3,158,600	1,811,000	1,419,900	6,301,600
1985	871,400	709,100	3,206,600	848,500	706,800	3,232,400	1,719,900	1,415,900	6,439,000
1986	826,100	699,300	3,264,100	803,900	697,900	3,297,500	1,630,000	1,397,200	6,561,600
1987	798,700	695,400	3,304,300	769,900	689,600	3,337,800	1,568,600	1,385,000	6,642,100
1988	792,900	672,000	3,353,700	758,400	662,900	3,389,600	1,551,300	1,334,900	6,743,300
1989	798,400	641,800	3,404,500	761,300	629,800	3,439,700	1,559,700	1,271,600	6,844,200

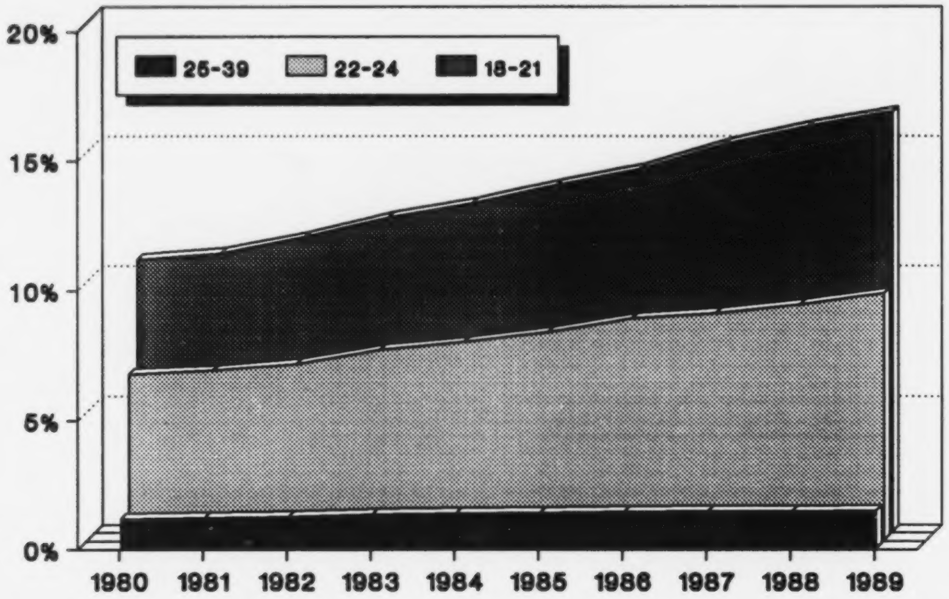
Participation Rates

	%	%	%	%	%	%	%	%	%
1980	10.5	7.8	1.3	10.5	5.1	0.9	10.5	6.4	1.1
1981	10.6	7.8	1.3	10.9	5.4	1.0	10.8	6.6	1.2
1982	11.1	8.0	1.4	11.6	5.6	1.0	11.4	6.8	1.2
1983	11.7	8.6	1.5	12.6	6.2	1.1	12.1	7.4	1.3
1984	12.1	8.8	1.5	13.3	6.6	1.1	12.7	7.7	1.3
1985	12.5	9.1	1.5	14.2	7.0	1.2	13.4	8.0	1.4
1986	13.0	9.5	1.6	15.1	7.6	1.2	14.0	8.6	1.4
1987	13.6	9.6	1.6	16.4	7.9	1.3	15.0	8.8	1.4
1988	14.0	9.8	1.6	17.4	8.4	1.3	15.7	9.1	1.4
1989	14.3	10.0	1.6	18.3	9.0	1.3	16.2	9.5	1.4

Average Annual Change

	%	%	%	%	%	%	%	%	%
1985/1980	3.7	3.2	3.0	6.2	6.6	5.2	5.0	4.6	3.9
1989/1985	3.4	2.5	0.4	6.4	6.6	3.3	5.0	4.3	1.7

PARTICIPATION RATES
BY AGE GROUP



Participation rates express the number of full-time Canadian students in selected age groups as a proportion of the total population in these age groups. The rates, therefore can be affected by changes in both enrolment and population. Participation rates of the various age groups differ, as do those of men and women.

The participation rate for the 18-21 age group increased steadily over the decade, rising from 10.5% in 1980 to 16.2% in 1989. The population in this age group peaked in 1981 and then fell each year until 1988 (a 20% decline). Even so, over the decade, the number of students in this age range increased 28%. In the middle of the decade, despite a relatively large downturn in population, the number of students in this age group remained almost constant. In the latter part of the decade, as the population declines slowed, the number of students increased.

The participation rate of 22-24-year-olds also rose steadily throughout the 1980s despite fluctuations in the size of this age group. Enrolment grew rapidly at the beginning of the decade, outpacing the rate of growth of the population in this age group. At the end of the decade, because enrolment remained constant as the population declined, the participation rate continued to rise.

Participation rates of the 25-39 age group have been virtually stable since 1985, as both enrolment and the population in this age group increased at the same pace (about 12%).

While the population trends are the same for both sexes, the changes in the participation rates of men and women differ significantly. As a result of much higher enrolment growth, the 1989 participation rate of women aged 18-21 was four full percentage points higher than that of men, even though the rates had been exactly the same in 1980. The gap in the participation rates of 22-24-year-olds had narrowed by 1989, with women's rate amounting to 90% of that of men; by contrast, in 1980, the corresponding figure had been 65%.

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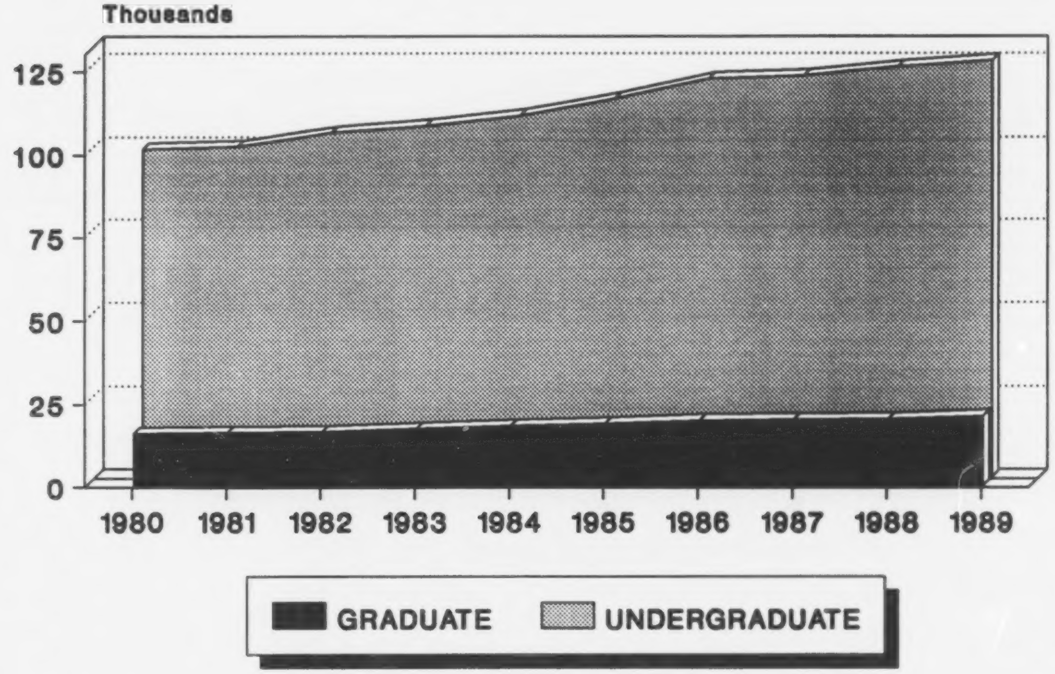
Degrees, Diplomas, and Certificates
by Level and Sex

	Undergraduate			**Graduate**				**Annual Rate of Change**	
	Bachelor's and First Professional	Diploma and Certificate	Total	Master's	PhD	Diploma and Certificate	Total	Undergrad %	Graduate %
1980	86,410	12,238	98,648	12,432	1,738	1,621	15,791		
1981	84,926	14,519	99,445	12,903	1,816	1,417	16,136	0.8	2.2
1982	87,106	16,711	103,817	13,110	1,715	1,504	16,329	4.4	1.2
1983	89,770	16,115	105,885	13,925	1,821	1,654	17,400	2.0	6.6
1984	92,828	16,097	108,925	14,562	1,878	1,796	18,236	2.9	4.8
1985	97,569	16,371	113,940	15,187	2,001	1,624	18,812	4.6	3.2
1986	101,668	18,145	119,813	15,948	2,218	1,642	19,808	5.2	5.3
1987	103,082	17,568	120,650	15,968	2,375	1,673	20,016	0.7	1.1
1988	103,797	19,594	123,391	16,240	2,415	1,629	20,284	2.3	1.3
1989	105,239	20,048	125,287	16,684	2,573	1,897	21,154	1.5	4.3
Male									
1980	43,590	5,486	49,076	7,778	1,339	1,027	10,144		
1981	42,215	6,384	48,599	7,848	1,377	840	10,065	-1.0	-0.8
1982	42,644	7,029	49,673	7,803	1,290	877	9,970	2.2	-0.9
1983	43,952	7,252	51,204	8,243	1,370	937	10,550	3.1	5.8
1984	45,354	6,911	52,265	8,632	1,368	947	10,947	2.1	3.8
1985	46,958	6,880	53,838	8,806	1,473	877	11,156	3.0	1.9
1986	48,206	7,162	55,368	9,038	1,609	788	11,435	2.8	2.5
1987	48,427	7,082	55,509	8,770	1,698	777	11,245	0.3	-1.7
1988	48,060	7,604	55,664	8,942	1,677	650	11,269	0.3	0.2
1989	47,743	7,605	55,348	9,136	1,790	815	11,741	-0.6	4.2
Female									
1980	42,820	6,752	49,572	4,654	399	594	5,647		
1981	42,711	8,135	50,846	5,055	439	577	6,071	2.6	7.5
1982	44,462	9,682	54,144	5,307	425	627	6,359	6.5	4.7
1983	45,818	8,863	54,681	5,682	451	717	6,850	1.0	7.7
1984	47,474	9,186	56,660	5,930	510	849	7,289	3.6	6.4
1985	50,611	9,491	60,102	6,381	528	747	7,656	6.1	5.0
1986	53,462	10,983	64,445	6,910	609	854	8,373	7.2	9.4
1987	54,655	10,486	65,141	7,198	677	896	8,771	1.1	4.8
1988	55,737	11,990	67,727	7,298	738	979	9,015	4.0	2.8
1989	57,496	12,443	69,939	7,548	783	1,082	9,413	3.3	4.4

Rate of Change During Decade

	%	%	%	%	%	%	%
Total	21.8	63.8	27.0	34.2	48.0	17.0	34.0
Male	9.5	38.6	12.8	17.5	33.7	-20.6	15.7
Female	34.3	84.3	41.1	62.2	96.2	82.2	66.7

DEGREES, DIPLOMAS, AND CERTIFICATES BY LEVEL



Canadian universities granted 146,400 degrees, diplomas, and certificates in 1989, up 28% from 114,400 nine years earlier. In 1989, 86% were granted at the undergraduate level, virtually the same proportion as in 1980.

The number of undergraduate degrees, diplomas, and certificates granted grew by 27% from 98,600 in 1980 to 125,300 in 1989. However, annual growth rates varied from less than 1% in 1987 to more than 5% in 1986.

The number of graduate degrees, diplomas, and certificates granted increased even faster, rising 34% from 15,791 to 21,154. Annual growth was particularly strong in the 1982-1985 period, when it averaged close to 5%.

Between 1980 and 1989, the number of undergraduate degrees, diplomas, and certificates earned by women increased 41%, while the number awarded to men rose only 12%. As a result, in 1989, women earned 56% of all undergraduate degrees, diplomas and certificates, compared with just under 50% in 1980.

At the graduate level, too, women's representation increased. The number of graduate degrees, diplomas, and certificates granted to women rose 67% versus only 16% for men. Notwithstanding this significant increase, in 1989, men still outnumbered women at the graduate level of certification, particularly among doctoral degree recipients.

Bachelor's and First Professional Degrees
by Field and Sex

	FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6	FIELD 7	FIELD 8	FIELD 9	TOTAL
1980	7,429	16,901	2,670	9,482	27,095	5,458	7,247	5,759	4,369	86,410
1981	7,780	16,416	2,649	8,543	27,300	5,077	7,083	5,811	4,267	84,926
1982	7,760	15,883	2,738	8,733	28,934	4,915	7,225	6,051	4,867	87,106
1983	8,398	15,457	2,845	8,813	30,072	4,811	7,734	6,089	5,551	89,770
1984	8,025	15,309	2,915	9,028	31,944	4,855	8,079	6,093	6,580	92,828
1985	7,737	15,160	3,036	9,922	34,258	5,130	8,357	6,398	7,571	97,569
1986	7,688	15,886	3,161	10,334	35,727	5,914	8,271	6,663	8,024	101,668
1987	6,713	16,139	3,218	10,970	36,492	6,382	8,593	6,950	7,625	103,082
1988	2,675	16,196	3,559	12,350	39,163	7,208	7,994	7,423	7,229	103,797
1989	2,378	16,954	3,375	12,837	40,404	7,282	7,916	7,309	6,784	105,239

Annual Rate of Change

	%	%	%	%	%	%	%	%	%	%
1981/1980	4.7	-2.9	-0.8	-9.9	0.8	-7.0	-2.3	0.9	-2.3	-1.7
1982/1981	-0.3	-3.2	3.4	2.2	6.0	-3.2	2.0	4.1	14.1	2.6
1983/1982	8.2	-2.7	3.9	0.9	3.9	-2.1	7.0	0.6	14.1	3.1
1984/1983	-4.4	-1.0	2.5	2.4	6.2	0.9	4.5	0.1	18.5	3.4
1985/1984	-3.6	-1.0	4.2	9.9	7.2	5.7	3.4	5.0	15.1	5.1
1986/1985	-0.6	4.8	4.1	4.2	4.3	15.3	-1.0	4.1	6.0	4.2
1987/1986	-12.7	1.6	1.8	6.2	2.1	7.9	3.9	4.3	-5.0	1.4
1988/1987	-60.2	0.4	10.6	12.6	7.3	12.9	-7.0	6.8	-5.2	0.7
1989/1988	-11.1	4.7	-5.2	3.9	3.2	1.0	-1.0	-1.5	-6.2	1.4

Male

1980	3,194	5,279	942	3,785	15,514	2,703	6,699	2,346	3,128	43,590
1981	3,266	5,039	978	3,488	15,065	2,521	6,491	2,364	3,003	42,215
1982	3,292	4,625	994	3,375	15,751	2,306	6,557	2,259	3,485	42,644
1983	3,544	4,648	958	3,390	16,116	2,237	6,921	2,201	3,937	43,952
1984	3,375	4,540	1,020	3,428	16,651	2,184	7,210	2,149	4,797	45,354
1985	3,257	4,383	1,083	3,850	17,192	2,288	7,388	2,161	5,356	46,958
1986	3,244	4,732	1,117	3,970	17,497	2,571	7,256	2,082	5,737	48,206
1987	2,875	4,821	1,159	4,110	17,595	2,769	7,545	2,090	5,463	48,427
1988	1,036	4,857	1,235	4,608	18,534	3,147	6,991	2,442	5,210	48,060
1989	915	5,130	1,161	4,842	18,651	3,167	6,852	2,135	4,890	47,743

Female

1980	4,235	11,622	1,728	5,697	11,581	2,755	548	3,413	1,241	42,820
1981	4,514	11,377	1,671	5,055	12,235	2,556	592	3,447	1,264	42,711
1982	4,468	11,258	1,744	5,358	13,183	2,609	668	3,792	1,382	44,462
1983	4,854	10,809	1,887	5,423	13,956	2,574	813	3,888	1,614	45,818
1984	4,650	10,769	1,895	5,600	15,293	2,671	869	3,944	1,783	47,474
1985	4,480	10,777	1,953	6,072	17,066	2,842	969	4,237	2,215	50,611
1986	4,444	11,154	2,044	6,364	18,230	3,343	1,015	4,581	2,287	53,462
1987	3,838	11,318	2,059	6,860	18,897	3,613	1,048	4,860	2,162	54,655
1988	1,639	11,339	2,324	7,742	20,629	4,061	1,003	4,981	2,019	55,737
1989	1,463	11,824	2,214	7,995	21,753	4,115	1,064	5,174	1,894	57,496

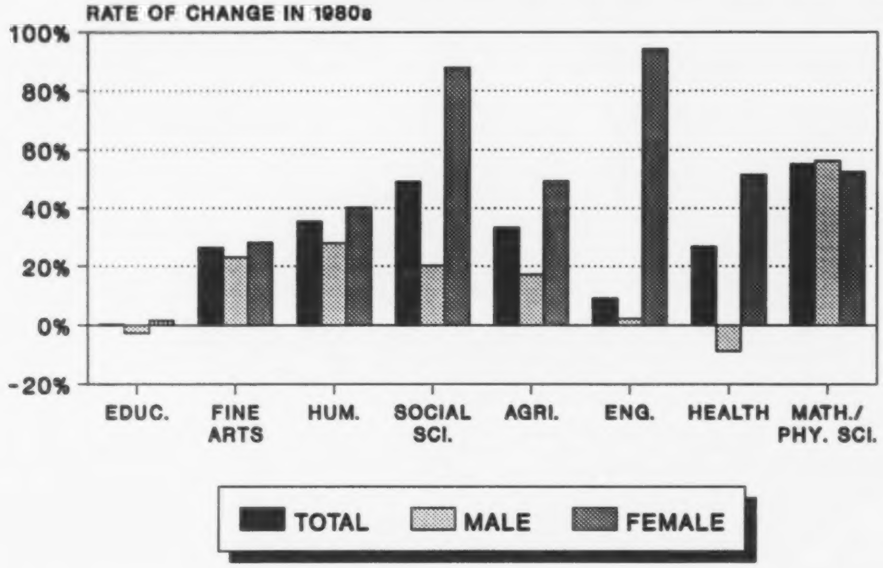
Rate of Change During Decade

	%	%	%	%	%	%	%	%	%	%
Total	-68.0	0.3	26.4	35.4	49.1	33.4	9.2	26.9	55.3	21.8
Male	-71.4	-2.8	23.2	27.9	20.2	17.2	2.3	-9.0	56.3	9.5
Female	-65.5	1.7	28.1	40.3	87.8	49.4	94.2	51.6	52.6	34.3

LEGEND - FIELDS OF STUDY

1 - General Arts/Sciences
2 - Education/Recreation
3 - Fine/Applied Arts
4 - Humanities
5 - Social Sciences
6 - Agriculture/ Biological Sciences
7 - Engineering/Applied Sciences
8 - Health Professions
9 - Mathematics/Physical Sciences

BACHELOR'S AND FIRST PROFESSIONAL DEGREES, BY FIELD AND SEX



A total of 105,200 bachelor's and first professional degrees were awarded in 1989, up 22% from 86,400 in 1980. Growth of the number of degrees granted, however, varied with the field of study and the sex of the recipients.

At the beginning of the decade, some institutions classified all students, except those in some professional programs, as general arts and sciences enrolment. In 1984 a large institution began classifying students in the appropriate fields. By 1988 the degrees granted by this institution were distributed by field rather than being reported under general arts and sciences. This affected some fields more than others. While this classification change distorts trends in the bachelor's enrolment by field of study, those with large and small growth can still be identified.

Excluding the above noted exception, the number of graduates increased in all fields of study. In some cases, however, there has been a decline since the middle of the decade. For instance, while engineering/applied sciences, grew by 9% over the decade there were almost 700 fewer degrees granted in 1989 than in 1987. In mathematics/physical sciences there were 55% more bachelor's degrees granted in 1989 than in 1980, but 15% fewer than in 1986.

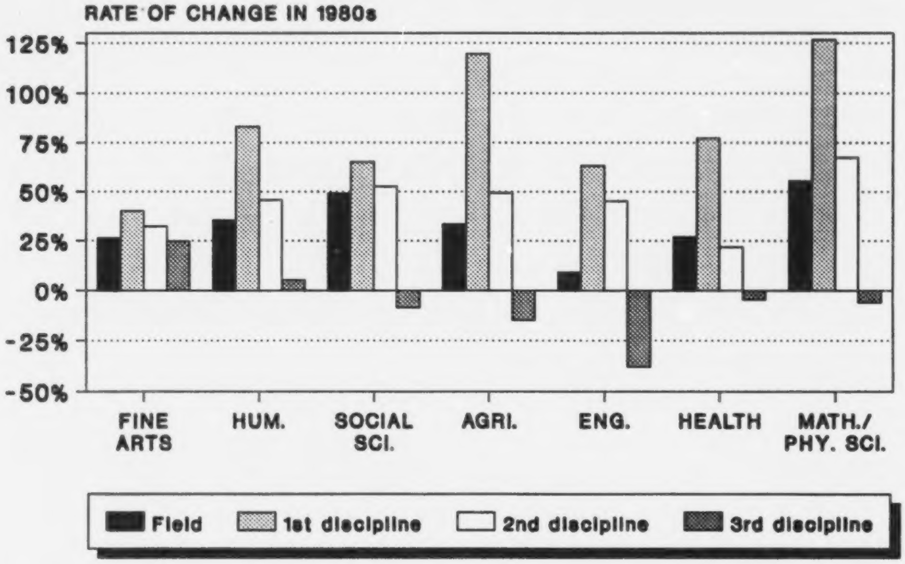
The number of degrees granted in social sciences rose steadily between 1980 and 1989 from 27,100 to 40,400 or 49%. More degrees were earned in this field than in any other, and by 1989, it accounted for nearly 40% of all degrees. Business-related specialties made up a large share of the degrees granted in this field.

By 1989, women accounted for two-thirds of all graduates in three fields of study: the humanities, education and recreational studies, and the fine arts. They also earned more than half of all degrees granted in the social sciences, agricultural/biological sciences, and the health professions. Although the number of women graduating in engineering/applied sciences almost doubled during the decade, they represented only one out of every eight graduates in 1989.

Bachelor's and First Professional Degrees
by Field and Discipline

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Rate of Change During Decade %
GENERAL ARTS/SCIENCES	7,429	7,780	7,760	8,398	8,025	7,737	7,688	6,713	2,675	2,378	-68.0
EDUCATION/RECREATION	16,901	16,416	15,883	15,457	15,309	15,160	15,886	16,139	16,196	16,954	0.3
RECREATION	368	404	445	462	453	452	488	487	448	490	33.2
ELEMENTARY/SECONDARY	12,309	11,227	11,269	11,224	11,448	11,205	11,681	11,833	11,836	12,480	1.4
NON-TEACHING FIELDS	491	1,106	408	457	381	367	398	402	382	431	-12.2
OTHER	3,733	3,679	3,761	3,314	3,027	3,136	3,319	3,417	3,530	3,553	-4.8
FINE/APPLIED ARTS	2,670	2,649	2,738	2,845	2,915	3,036	3,161	3,218	3,559	3,375	26.4
APPLIED ARTS	568	631	594	657	732	729	746	729	920	796	40.1
OTHER PERFORMING ARTS	336	336	392	412	437	433	512	496	554	445	32.4
FINE ART	1,021	959	949	973	969	1,054	1,070	1,133	1,188	1,274	24.8
OTHER	745	723	803	803	777	820	833	860	897	860	15.4
HUMANITIES	9,482	8,543	8,733	8,813	9,028	9,922	10,334	10,970	12,350	12,837	35.4
OTHER MASS COMMUNICAT.	586	623	747	686	812	915	857	873	913	1,074	83.3
ENGLISH LANG./LIT.	2,608	2,199	2,158	2,312	2,389	2,733	2,943	3,182	3,720	3,800	45.7
TRANSLATION/INTER.	314	322	430	383	458	397	411	391	346	330	5.1
OTHER	5,974	5,399	5,398	5,432	5,369	5,877	6,123	6,524	7,371	7,633	27.8
SOCIAL SCIENCES	27,095	27,300	28,934	30,072	31,944	34,258	35,727	36,492	39,163	40,404	49.1
ECONOMICS	2,444	2,404	2,847	3,009	3,433	4,003	4,081	4,147	3,928	4,038	65.2
COMMERCE/MAN./BUS.	8,698	9,500	10,583	11,436	12,000	11,970	12,201	12,089	12,567	13,263	52.5
GEOGRAPHY	1,877	1,621	1,551	1,531	1,547	1,688	1,648	1,699	1,758	1,718	-8.5
OTHER	14,076	13,775	13,953	14,096	14,964	16,597	17,797	18,557	20,910	21,385	51.9
AGRI./BIO. SCI.	5,458	5,077	4,915	4,811	4,855	5,130	5,914	6,382	7,208	7,282	33.4
BIOCHEMISTRY	385	346	425	451	420	477	595	671	800	846	119.7
BIOLOGY	2,664	2,428	2,237	2,175	2,291	2,485	3,002	3,378	3,944	3,980	49.4
AGRICULTURE	880	893	845	837	782	777	784	765	739	751	-14.7
OTHER	1,529	1,410	1,408	1,348	1,362	1,391	1,533	1,568	1,725	1,705	11.5
ENG./APPLIED SCI.	7,247	7,083	7,225	7,734	8,079	8,357	8,271	8,593	7,994	7,916	9.2
OTHER ENGINEERING	462	490	514	611	641	720	705	733	718	754	63.2
ELECTRICAL ENG.	1,385	1,427	1,514	1,602	1,769	1,915	2,058	2,189	1,997	2,011	45.2
CIVIL ENG.	1,567	1,470	1,299	1,168	1,274	1,153	1,048	1,149	981	972	-38.0
OTHER	3,833	3,696	3,898	4,353	4,395	4,569	4,460	4,522	4,298	4,179	9.0
HEALTH PROFESSIONS	5,759	5,811	6,051	6,089	6,093	6,398	6,663	6,950	7,423	7,309	26.9
NURSING	1,474	1,379	1,625	1,769	1,821	1,997	2,262	2,485	2,406	2,615	77.4
REHABILITATION	809	832	839	857	857	866	877	919	974	986	21.9
DENTISTRY	488	479	480	490	480	503	530	496	498	466	-4.5
OTHER	2,988	3,121	3,107	2,973	2,935	3,032	2,994	3,050	3,545	3,242	8.5
MATH./PHYSICAL SCI.	4,369	4,267	4,867	5,551	6,580	7,571	8,024	7,625	7,229	6,784	55.3
COMPUTER SCIENCE	1,128	1,218	1,605	2,122	2,707	3,131	3,326	2,997	2,753	2,558	126.8
PHYSICS	420	364	404	451	520	573	652	662	702	704	67.6
GEOLOGY	474	469	607	736	908	970	847	666	586	445	-6.1
OTHER	2,347	2,216	2,251	2,242	2,445	2,897	3,199	3,300	3,188	3,077	31.1

BACHELOR'S AND FIRST PROFESSIONAL DEGREES, BY FIELD AND DISCIPLINE



During the 1980s, the number of bachelor's and first professional degrees granted by Canadian universities increased in all fields. Growth ranged from under 1% in education and recreational studies to over 55% in mathematics/physical sciences. Increases, however, varied widely in different disciplines.

The largest increases were in science-related disciplines. For instance, the number of degrees awarded in biochemistry and computer science more than doubled. However, while the annual number of biochemistry graduates increased steadily throughout the decade, the number of degrees awarded in computer science declined in the last three years of the decade. With growth of almost 80%, nursing experienced the largest gains in degrees granted in the health professions.

Almost the same number of degrees were awarded in elementary/secondary teaching in 1989 as in 1980. However, the number of degrees granted had dropped during the first half of the decade, and then rose in the late eighties. This growth at the end of the decade offset the earlier declines.

As well, the number of degrees awarded in commerce/business/administration rose 52% from 8,700 in 1980 to 13,300 in 1989. In fact, throughout the decade, degrees in these specialties accounted for one-third of all degrees granted in the social sciences.

Among the disciplines in engineering/applied science, growth was greatest in electrical engineering. But as in most engineering disciplines, there was little or no increase in degrees granted during the latter part of the decade. Moreover, the number of degrees awarded in civil engineering declined almost steadily throughout the decade, with about 40% fewer granted in 1989 than in 1980.

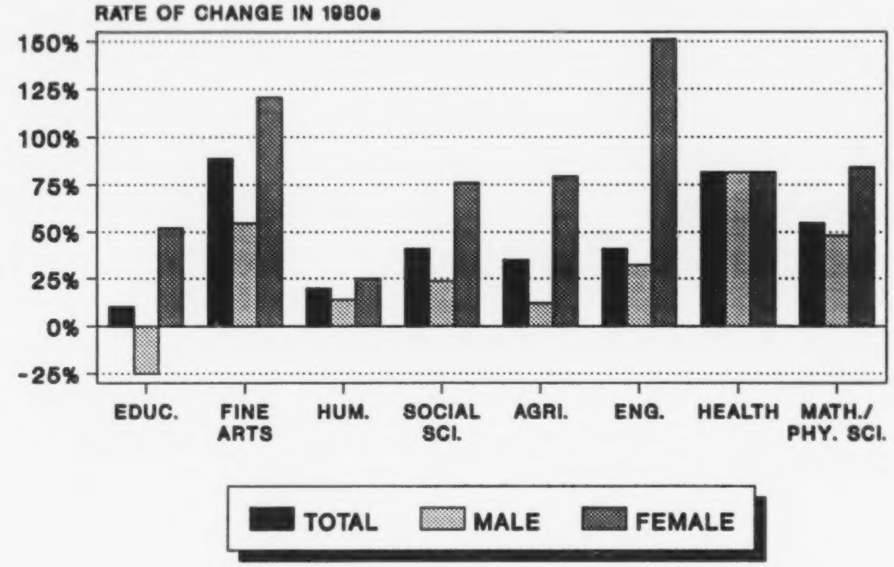
Master's Degrees
by Field and Sex

	FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6	FIELD 7	FIELD 8	FIELD 9	TOTAL
1980	5	2,826	196	1,792	4,616	617	1,109	504	767	12,432
1981	11	3,145	223	1,859	4,767	609	1,036	555	698	12,903
1982	9	2,862	249	1,844	4,962	632	1,176	594	782	13,110
1983	12	3,030	258	1,884	5,425	624	1,285	574	833	13,925
1984	33	2,793	320	1,958	5,613	668	1,574	657	946	14,562
1985	18	2,921	291	2,012	5,874	705	1,612	723	1,031	15,187
1986	22	2,948	318	2,056	6,137	803	1,716	798	1,150	15,948
1987	17	3,071	304	2,118	6,043	782	1,574	891	1,168	15,968
1988	21	2,975	350	2,177	6,291	791	1,569	906	1,160	16,240
1989	39	3,118	370	2,151	6,511	833	1,562	915	1,185	16,684
Annual Rate of Change										
	%	%	%	%	%	%	%	%	%	%
1981/1980	120.0	11.3	13.8	3.7	3.3	-1.3	-6.6	10.1	-9.0	3.8
1982/1981	-18.2	-9.0	11.7	-0.8	4.1	3.8	13.5	7.0	12.0	1.6
1983/1982	33.3	5.9	3.6	2.2	9.3	-1.3	9.3	-3.4	6.5	6.2
1984/1983	175.0	-7.8	24.0	3.9	3.5	7.1	22.5	14.5	13.6	4.6
1985/1984	-45.5	4.6	-9.1	2.8	4.6	5.5	2.4	10.0	9.0	4.3
1986/1985	22.2	0.9	9.3	2.2	4.5	13.9	6.5	10.4	11.5	5.0
1987/1986	-22.7	4.2	-4.4	3.0	-1.5	-2.6	-8.3	11.7	1.6	0.1
1988/1987	23.5	-3.1	15.1	2.8	4.1	1.2	-0.3	1.7	-0.7	1.7
1989/1988	85.7	4.8	5.7	-1.2	3.5	5.3	-0.4	1.0	2.2	2.7
Male										
1980	2	1,528	95	812	3,096	408	1,031	173	633	7,778
1981	8	1,603	105	829	3,172	380	948	216	587	7,848
1982	5	1,367	110	790	3,190	392	1,078	244	627	7,803
1983	6	1,432	127	837	3,399	374	1,173	232	663	8,243
1984	24	1,235	156	860	3,495	409	1,439	250	764	8,632
1985	13	1,225	125	876	3,601	435	1,443	281	807	8,806
1986	11	1,178	144	874	3,664	446	1,533	280	908	9,038
1987	8	1,179	131	889	3,533	425	1,400	306	899	8,770
1988	5	1,167	144	939	3,665	449	1,380	300	893	8,942
1989	10	1,145	147	925	3,833	458	1,366	314	938	9,136
Female										
1980	3	1,298	101	980	1,520	209	78	331	134	4,654
1981	3	1,542	118	1,030	1,595	229	88	339	111	5,055
1982	4	1,495	139	1,054	1,772	240	98	350	155	5,307
1983	6	1,598	131	1,047	2,026	250	112	342	170	5,682
1984	9	1,558	164	1,098	2,118	259	135	407	182	5,930
1985	5	1,696	166	1,136	2,273	270	169	442	224	6,381
1986	11	1,770	174	1,182	2,473	357	183	518	242	6,910
1987	9	1,892	173	1,229	2,510	357	174	585	269	7,198
1988	16	1,808	206	1,238	2,626	342	189	606	267	7,298
1989	29	1,973	223	1,226	2,678	375	196	601	247	7,548
Rate of Change During Decade										
	%	%	%	%	%	%	%	%	%	%
Total	680.0	10.3	88.8	20.0	41.1	35.0	40.8	81.5	54.5	34.2
Male	400.0	-25.1	54.7	13.9	23.8	12.3	32.5	81.5	48.2	17.5
Female	866.7	52.0	120.8	25.1	76.2	79.4	151.3	81.6	84.3	62.2

LEGEND - FIELDS OF STUDY

1 - General Arts/Sciences
2 - Education/Recreation
3 - Fine/Applied Arts
4 - Humanities
5 - Social Sciences
6 - Agriculture/ Biological Sciences
7 - Engineering/Applied Sciences
8 - Health Professions
9 - Mathematics/Physical Sciences

MASTER'S DEGREES BY FIELD AND SEX



Canadian universities granted 16,684 master's degrees in 1989, an increase of 34% since 1980. Growth was most rapid in the smaller fields of study. For instance, the number of degrees in fine and applied arts and in the health professions rose by more than 80%. There was also a 55% increase in degrees in mathematics/physical sciences, but virtually all of this growth occurred in the first half of the decade.

The slowest growing fields were the humanities and education/recreation studies. The number of master's degrees awarded in the humanities increased early in the decade, but remained relatively constant in the latter part of the 1980s, while the number granted in education/recreation studies fluctuated between 2,800 and 3,100.

By 1989, 53% of all master's degrees were in the social sciences, reflecting a 40% rise in degrees granted in this field over the decade. The number of degrees awarded in engineering/applied sciences also climbed by about 40% from the beginning to the end of the decade, although the number peaked in 1986 and then fell in the last three years of the decade.

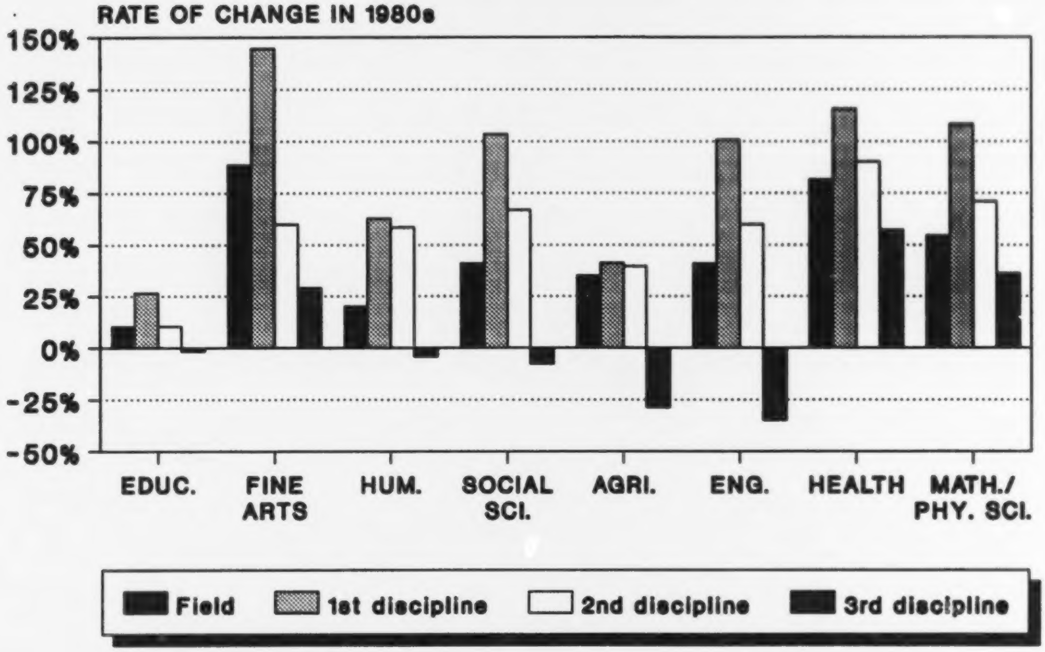
Female master's graduates were more likely than their male counterparts to earn their degrees in the social sciences and humanities. Women received about two-thirds of the master's degrees awarded in education and the health professions, and over half the degrees in the humanities and fine arts.

On the other hand, women obtained only 30% of all master's degrees granted in science-related disciplines in 1989, although this was up 5 percentage points from 1980. In 1989, women earned 21% of master's degrees granted in mathematics/physical sciences, up from 17% in 1980. Similarly, 13% of master's degrees in engineering/applied sciences were earned by women in 1989, compared with 8% in 1980.

Master's Degrees
by Field and Discipline

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Rate of Change During Decade %
GENERAL ARTS/SCIENCES	5	11	9	12	33	18	22	17	21	39	680.0
EDUCATION/RECREATION	2,826	3,145	2,862	3,030	2,793	2,921	2,948	3,071	2,975	3,118	10.3
PHYSICAL EDUCATION	140	158	148	159	127	164	188	164	173	177	26.4
ELEMENTARY/SECONDARY	909	948	951	995	961	957	939	1,056	975	1,002	10.2
NON-TEACHING FIELDS	1,702	1,937	1,649	1,800	1,655	1,733	1,756	1,608	1,586	1,676	-1.5
OTHER	75	102	114	76	50	67	65	243	241	263	250.7
FINE/APPLIED ARTS	196	223	249	258	320	291	318	304	350	370	88.8
FINE ART	54	49	64	66	108	97	98	96	91	132	144.4
MUSIC	92	97	108	107	116	113	113	116	117	147	59.8
APPLIED ARTS	38	58	55	55	40	43	53	40	65	49	28.9
OTHER	12	19	22	30	56	38	54	52	77	42	250.0
HUMANITIES	1,792	1,859	1,844	1,884	1,958	2,012	2,056	2,118	2,177	2,151	20.0
FRENCH LANGUAGE	89	115	109	119	119	132	122	141	126	145	62.9
THEOLOGICAL STUDIES	116	129	155	171	204	167	197	178	187	184	58.6
LIBRARY SCIENCE	491	520	473	469	471	441	463	499	426	471	-4.1
OTHER	1,096	1,095	1,107	1,125	1,164	1,272	1,274	1,300	1,438	1,351	23.3
SOCIAL SCIENCES	4,616	4,767	4,962	5,425	5,613	5,874	6,137	6,043	6,291	6,511	41.1
SPECIALIZED ADMIN.	198	215	268	338	369	304	348	360	371	403	103.5
COMMERCE/MAN./BUS.	1,902	2,015	2,166	2,484	2,645	2,727	2,785	2,729	2,940	3,175	66.9
LAW/JURISPRUDENCE	131	144	113	137	107	87	149	107	127	121	-7.6
OTHER	2,385	2,393	2,415	2,466	2,492	2,756	2,855	2,847	2,853	2,812	17.9
AGRI./BIO. SCI.	617	609	632	624	668	705	803	782	791	833	35.0
AGRICULTURE	163	189	184	176	212	199	207	185	232	230	41.1
BIOLOGY	223	200	214	215	205	255	303	297	283	311	39.5
ZOOLOGY	109	86	91	96	86	101	107	96	77	78	-28.4
OTHER	122	134	143	137	165	150	186	204	199	214	75.4
ENG./APPLIED SCI.	1,109	1,036	1,176	1,285	1,574	1,612	1,716	1,574	1,569	1,562	40.8
ELECTRICAL ENG.	209	215	242	245	320	337	389	373	332	420	101.0
MECHANICAL ENG.	137	115	152	184	182	258	274	200	230	219	59.9
ARCHITECTURE	78	55	51	52	51	62	54	69	46	51	-34.6
OTHER	685	651	731	804	1,021	955	999	932	961	872	27.3
HEALTH PROFESSIONS	504	555	594	574	657	723	798	891	906	915	81.5
NURSING	76	87	86	88	78	117	141	164	181	164	115.8
BASIC MEDICAL SCIENCE	135	136	152	155	178	202	190	271	226	257	90.4
EPIDEMIOLOGY	84	101	104	110	124	152	146	149	133	132	57.1
OTHER	209	231	252	221	277	252	321	307	366	362	73.2
MATH./PHYSICAL SCI.	767	698	782	833	946	1,031	1,150	1,168	1,160	1,185	54.5
COMPUTER SCIENCE	152	150	186	217	229	254	295	330	326	317	108.6
MATHEMATICS	148	131	161	164	203	199	219	192	222	253	70.9
GEOLOGY	136	128	146	133	190	215	211	216	183	185	36.0
OTHER	331	289	289	319	324	363	425	430	429	430	29.9

MASTER'S DEGREES BY FIELD AND DISCIPLINE



During the 1980s, education/recreation and social sciences were the predominant fields in which master's degrees were granted. Combined, they accounted for more than half of all master's degrees awarded by Canadian universities.

The two fastest growing areas of graduation in the social sciences were specialized administrative studies and commerce/business administration. Between 1980 and 1989, the number of master's degrees granted in these two disciplines increased by 104% and 67% respectively.

As well, the number of degrees granted in all science-related disciplines except zoology and architecture, increased. In fact, the number of master's degrees awarded in disciplines such as electrical engineering and computer science more than doubled over the decade. The latter grew rapidly until 1987 and dropped slightly during the last two years of the decade.

The number of master's degrees granted in the health professions grew markedly between 1980 and 1989. The most significant increases in this area of study occurred in nursing and basic medical science. They rose respectively by 116% and 90% over the decade, however, a year-by-year analysis reveals that growth was quite erratic during the first half of the decade in nursing while remaining stable in basic medical science. This pattern was reversed in the second half of the decade. Indeed, the number of master's degrees awarded in nursing rose steadily after 1984, except for a drop in 1989, whereas growth in basic medical science became erratic.

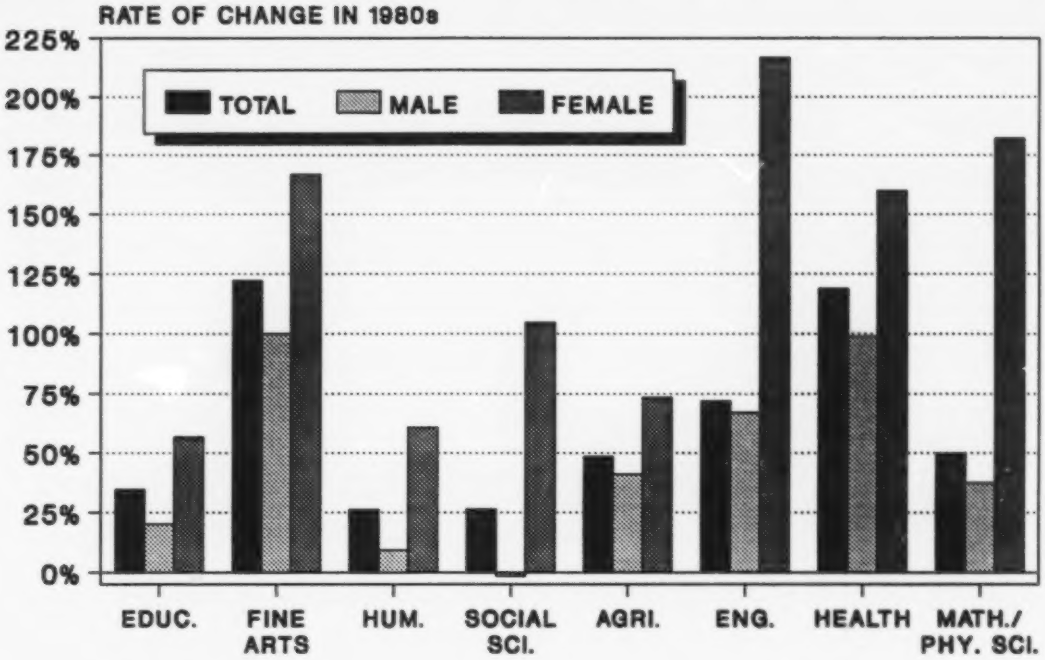
Doctoral Degrees
by Field and Sex

	FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6	FIELD 7	FIELD 8	FIELD 9	TOTAL
1980	7	205	9	242	403	210	191	137	334	1,738
1981	5	203	7	285	427	220	215	113	341	1,816
1982	6	213	12	231	381	221	183	150	318	1,715
1983	5	189	12	249	385	247	220	174	340	1,821
1984	8	209	13	263	411	237	188	176	373	1,878
1985	14	214	12	252	422	248	278	175	386	2,001
1986	14	231	14	290	480	281	296	202	410	2,218
1987	9	247	15	287	466	340	299	236	476	2,375
1988	14	231	13	292	496	323	350	231	465	2,415
1989	23	276	20	305	509	312	328	300	500	2,573
Annual Rate of Change										
	%	%	%	%	%	%	%	%	%	%
1981/1980	-28.6	-1.0	-22.2	17.8	6.0	4.8	12.6	-17.5	2.1	4.5
1982/1981	20.0	4.9	71.4	-18.9	-10.8	0.5	-14.9	32.7	-6.7	-5.6
1983/1982	-16.7	-11.3	0.0	7.8	1.0	11.8	20.2	16.0	6.9	6.2
1984/1983	60.0	10.6	8.3	5.6	6.8	-4.0	-14.5	1.1	9.7	3.1
1985/1984	75.0	2.4	-7.7	-4.2	2.7	4.6	47.9	-0.6	3.5	6.5
1986/1985	0.0	7.9	16.7	15.1	13.7	13.3	6.5	15.4	6.2	10.8
1987/1986	-35.7	6.9	7.1	-1.0	-2.9	21.0	1.0	16.8	16.1	7.1
1988/1987	55.6	-6.5	-13.3	1.7	6.4	-5.0	17.1	-2.1	-2.3	1.7
1989/1988	64.3	19.5	53.8	4.5	2.6	-3.4	-6.3	29.9	7.5	6.5
Male										
1980	4	124	6	163	298	161	185	92	306	1,339
1981	4	129	2	180	298	171	206	80	307	1,377
1982	2	122	8	151	268	170	175	112	282	1,290
1983	5	106	8	171	258	197	210	119	296	1,370
1984	5	111	5	161	280	177	179	119	331	1,368
1985	8	132	7	147	285	187	260	129	318	1,473
1986	10	114	8	191	304	215	287	131	349	1,609
1987	8	116	8	173	287	245	283	164	414	1,698
1988	8	113	8	174	302	213	320	145	394	1,677
1989	17	149	12	178	294	227	309	183	421	1,790
Female										
1980	3	81	3	79	105	49	6	45	28	399
1981	1	74	5	105	129	49	9	33	34	439
1982	4	91	4	80	113	51	8	38	36	425
1983	0	83	4	78	127	50	10	55	44	451
1984	3	98	8	102	131	60	9	57	42	510
1985	6	82	5	105	137	61	18	46	68	528
1986	4	117	6	99	176	66	9	71	61	609
1987	1	131	7	114	179	95	16	72	62	677
1988	6	118	5	118	194	110	30	86	71	738
1989	6	127	8	127	215	85	19	117	79	783
Rate of Change During Decade										
	%	%	%	%	%	%	%	%	%	%
Total	228.6	34.6	122.2	26.0	26.3	48.6	71.7	119.0	49.7	48.0
Male	325.0	20.2	100.0	9.2	-1.3	41.0	67.0	98.9	37.6	33.7
Female	100.0	56.8	166.7	60.8	104.8	73.5	216.7	160.0	182.1	96.2

LEGEND - FIELDS OF STUDY

1 - General Arts/Sciences
2 - Education/Recreation
3 - Fine/Applied Arts
4 - Humanities
5 - Social Sciences
6 - Agriculture/ Biological Sciences
7 - Engineering/Applied Sciences
8 - Health Professions
9 - Mathematics/Physical Sciences

DOCTORAL DEGREES BY FIELD AND SEX



A total of 2,578 doctoral degrees were granted in 1989, up almost 50% from 1,738 in 1980. During that period, the concentration of doctorates in science-related disciplines increased. By 1989, more than 55% of all doctorates granted were in these disciplines, compared with 50% nine years earlier.

The number of PhD's granted in education, the humanities, and the social sciences changed very little during the first half of the decade. However, each of these fields grew during the second half of the decade.

The pattern in the science-related fields was similar, although growth at the end of the decade was substantially higher. The number of doctorates granted in mathematics/physical sciences increased by 50% overall and represented about one-fifth of all doctoral degrees granted in both 1980 and 1989.

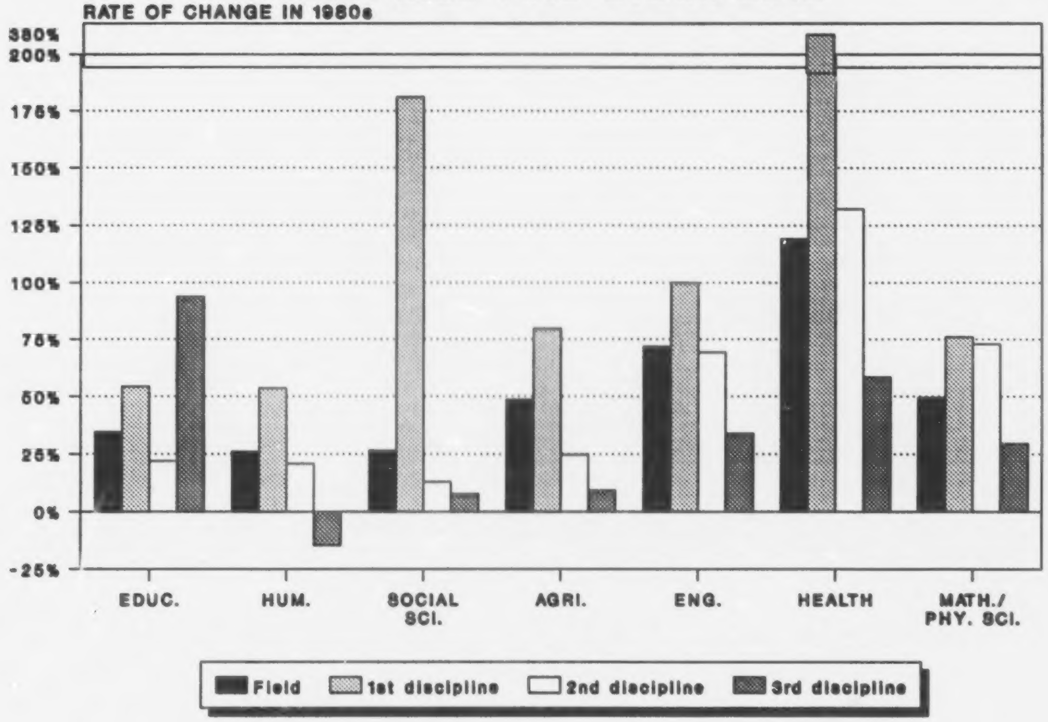
It is also worth noting that for the first time since 1985, the number of PhD's in engineering/applied sciences declined in 1989. By comparison, the number of master's and bachelor's degrees granted in this field declined throughout the last half of the decade.

Despite substantial increases in all fields, women still accounted for a relatively small proportion of doctoral degree graduates in 1989. They obtained one-third of all doctorates in 1989, although differences by field of study were significant. Women accounted for over 40% of PhD graduates in the social sciences and humanities, but fewer than 20% of those in mathematics/physical sciences and just 6% in engineering/applied sciences.

Doctoral Degrees
by Field and Discipline

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Rate of Growth During Decade %
GENERAL ARTS/SCIENCES	7	5	6	5	8	14	14	9	14	23	228.6
EDUCATION/RECREATION	205	203	213	189	209	214	231	247	231	276	34.6
ELEMENTARY/SECONDARY	44	35	62	61	62	71	54	65	54	68	54.5
NON-TEACHING FIELDS	145	152	130	116	127	118	156	138	151	177	22.1
OTHER	16	16	21	12	20	25	21	44	26	31	93.8
FINE/APPLIED ARTS	9	7	12	12	13	12	14	15	13	20	122.2
HUMANITIES	242	285	231	249	263	252	290	287	292	305	26.0
HISTORY	39	39	42	40	42	44	58	55	49	60	53.8
ENGLISH LANGUAGE/LITERATURE	63	87	54	64	68	58	59	51	68	76	20.6
PHILOSOPHY	41	40	40	58	41	29	46	41	41	35	-14.6
OTHER	99	119	95	87	112	121	127	140	134	134	35.4
SOCIAL SCIENCES	403	427	381	385	411	422	480	466	496	509	26.3
COMMERCE/MAN./BUS.	16	23	18	22	21	31	32	41	37	45	181.3
ECONOMICS	62	61	57	51	58	59	63	60	68	70	12.9
PSYCHOLOGY	184	185	155	155	171	169	203	193	192	198	7.6
OTHER	141	158	151	157	161	163	182	172	199	196	39.0
AGRI./BIO. SCI.	210	220	221	247	237	248	281	340	323	312	48.6
AGRICULTURE	49	52	45	49	55	68	76	86	84	88	79.6
BIOLOGY	77	70	81	97	81	94	97	127	111	96	24.7
ZOOLOGY	33	31	42	42	34	36	41	43	33	36	9.1
OTHER	51	67	53	59	67	50	67	84	95	92	80.4
ENG./APPLIED SCI.	191	215	183	220	188	278	296	299	350	328	71.7
MECHANICAL ENG.	22	27	29	32	25	46	36	42	49	44	100.0
CHEMICAL ENG.	26	34	32	35	29	27	38	48	48	44	69.2
ELECTRICAL ENG.	62	52	53	50	51	77	82	79	112	83	33.9
OTHER	81	102	69	103	83	128	140	130	141	157	93.8
HEALTH PROFESSIONS	137	113	150	174	176	175	202	236	231	300	119.0
MEDICAL SPECIALITIES	12	12	18	16	8	18	24	30	29	55	358.3
PARACLINICAL SCIENCES	25	21	22	19	32	26	43	41	42	58	132.0
BASIC MEDICAL SCIENCES	87	70	90	111	115	104	106	134	120	138	58.6
OTHER	13	10	20	28	21	27	29	31	40	49	276.9
MATH./PHYSICAL SCI.	334	341	318	340	373	386	410	476	465	500	49.7
MATHEMATICS	46	61	50	48	55	46	69	79	63	81	76.1
PHYSICS	63	78	68	82	85	100	89	103	96	109	73.0
CHEMISTRY	145	135	120	139	152	138	153	177	193	188	29.7
OTHER	80	67	80	71	81	102	99	117	113	122	52.5

DOCTORAL DEGREES BY FIELD AND DISCIPLINE



Overall increases in the number of PhDs granted by Canadian universities during the 1980s mask considerable variations in specific disciplines.

For example, while the number of doctoral degrees awarded in the health professions more than doubled during the decade, within that field, increases were even larger in medical specialties and paraclinical sciences. Nonetheless, these two disciplines continued to account for a relatively small proportion of all PhDs granted in the health professions.

In contrast to the bachelor's and master's levels, comparatively few doctorates were awarded in commerce/management/business. Despite a threefold increase during the 1980s, only 45 doctorates were granted in this discipline in 1989.

The number of degrees granted in many well-established disciplines such as philosophy, psychology and chemistry has fluctuated within a fairly narrow range, resulting in only marginal increases during the decade.

Growth in the number of doctorates granted in the various engineering disciplines was erratic throughout the 1980s. For instance, while twice as many PhD's were earned in mechanical engineering in 1989 than in 1980, there was virtually no growth in the latter half of the decade.

FACULTY

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Full-Time Faculty
by Major Field

	FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6	FIELD 7	FIELD 8	FIELD 9	TOTAL
1976	3,220	1,260	5,970	7,545	2,387	2,351	4,362	4,230	323	31,648
1977	3,254	1,322	6,014	7,783	2,347	2,377	4,495	4,272	303	32,167
1978	3,235	1,355	6,014	7,964	2,357	2,405	4,645	4,297	373	32,645
1979	3,168	1,344	5,937	8,010	2,344	2,452	4,791	4,313	444	32,803
1980	3,148	1,382	5,928	8,125	2,377	2,477	5,103	4,330	429	33,299
1981	3,115	1,420	5,864	8,246	2,348	2,504	5,207	4,332	563	33,599
1982	3,145	1,462	5,790	8,403	2,406	2,544	5,251	4,436	641	34,078
1983	3,118	1,469	5,760	8,474	2,326	2,626	5,522	4,480	505	34,280
1984	3,099	1,477	5,802	8,657	2,344	2,642	5,676	4,598	370	34,665
1985	3,098	1,487	5,915	8,819	2,382	2,723	5,748	4,709	290	35,171
1986	3,062	1,499	5,953	8,928	2,520	2,708	5,677	4,687	339	35,373
1987	3,041	1,495	5,928	9,037	2,543	2,755	5,701	4,709	395	35,604
1988	3,065	1,549	6,064	9,211	2,558	2,794	5,757	4,761	627	36,386

Percentage Distribution

	%	%	%	%	%	%	%	%	%	%
1976	10.2	4.0	18.9	23.8	7.5	7.4	13.8	13.4	1.0	100.0
1977	10.1	4.1	18.7	24.2	7.3	7.4	14.0	13.3	0.9	100.0
1978	9.9	4.2	18.4	24.4	7.2	7.4	14.2	13.2	1.1	100.0
1979	9.7	4.1	18.1	24.4	7.1	7.5	14.6	13.1	1.4	100.0
1980	9.5	4.2	17.8	24.4	7.1	7.4	15.3	13.0	1.3	100.0
1981	9.3	4.2	17.5	24.5	7.0	7.5	15.5	12.9	1.7	100.0
1982	9.2	4.3	17.0	24.7	7.1	7.5	15.4	13.0	1.9	100.0
1983	9.1	4.3	16.8	24.7	6.8	7.7	16.1	13.1	1.5	100.0
1984	8.9	4.3	16.7	25.0	6.8	7.6	16.4	13.3	1.1	100.0
1985	8.8	4.2	16.8	25.1	6.8	7.7	16.3	13.4	0.8	100.0
1986	8.7	4.2	16.8	25.2	7.1	7.7	16.0	13.3	1.0	100.0
1987	8.5	4.2	16.6	25.4	7.1	7.7	16.0	13.2	1.1	100.0
1988	8.4	4.3	16.7	25.3	7.0	7.7	15.8	13.1	1.7	100.0

Proportion of Women

1976	23.1	20.5	17.2	12.1	16.2	1.0	22.8	3.7	19.5	14.4
1977	23.3	20.6	18.3	12.8	16.2	1.2	23.3	3.9	10.6	14.9
1978	23.6	20.6	18.1	13.0	15.4	1.2	22.9	4.1	12.1	14.8
1979	24.0	21.1	18.2	13.2	15.6	1.3	22.9	4.4	15.3	15.0
1980	24.0	21.4	18.8	13.9	16.3	1.3	23.4	4.7	12.8	15.5
1981	24.5	22.0	19.1	14.0	16.1	1.7	23.1	4.7	19.7	15.7
1982	25.0	23.3	19.2	14.6	16.4	1.8	23.3	5.2	22.6	16.1
1983	25.3	22.9	19.6	15.2	16.6	1.9	23.3	5.4	17.6	16.3
1984	25.4	23.3	20.0	15.7	16.3	1.9	23.6	5.4	17.8	16.6
1985	26.0	23.8	20.8	16.2	16.7	2.3	23.8	5.6	26.9	17.0
1986	26.6	24.5	21.9	16.9	16.5	2.1	24.0	6.0	27.1	17.6
1987	27.1	24.3	22.4	17.6	17.0	2.4	24.1	6.1	26.6	17.9
1988	28.5	25.4	23.4	18.4	17.6	2.9	25.0	6.3	28.2	18.8

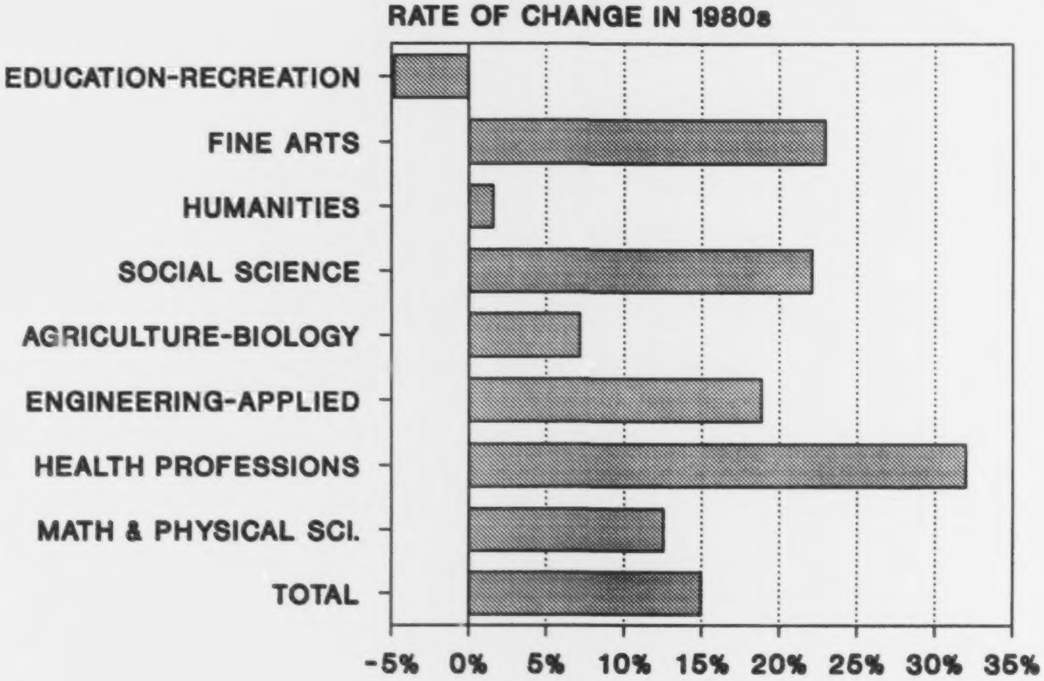
Rate of Change 1976 to 1988

	%	%	%	%	%	%	%	%	%	%
Female	17.4	52.3	38.2	84.6	16.8	252.2	45.2	93.5	181.0	49.6
Total	-4.8	22.9	1.6	22.1	7.2	18.8	32.0	12.6	94.1	15.0

LEGEND - FIELDS OF STUDY

1 - Education/Recreation
2 - Fine/Applied arts
3 - Humanities
4 - Social Sciences
5 - Agri./Biol. Sciences
6 - Engineering/Applied Sciences
7 - Health Professions
8 - Mathematics/Physical sciences
9 - Unknown/Not reported

FULL-TIME FACULTY BY FIELD



From 1976 to 1988 the total number of full-time faculty at Canadian universities grew 15% (an average of 1.2% annually) from 31,648 to 36,386. By comparison, full-time equivalent enrolment grew by 36% over the same period, more than twice the growth in full-time faculty. Rates of growth, however, varied in different fields of study. In fact, the number of faculty in the education disciplines actually declined by about 100 over the period, while there was almost no overall change in the number of faculty in humanities and growth in agricultural/biological sciences was also below average.

By contrast, the number of faculty in the health professions rose over 36%, more than twice the average growth. As a result, the health professions accounted for about 16% of all faculty in 1988 up from around 14% in 1976.

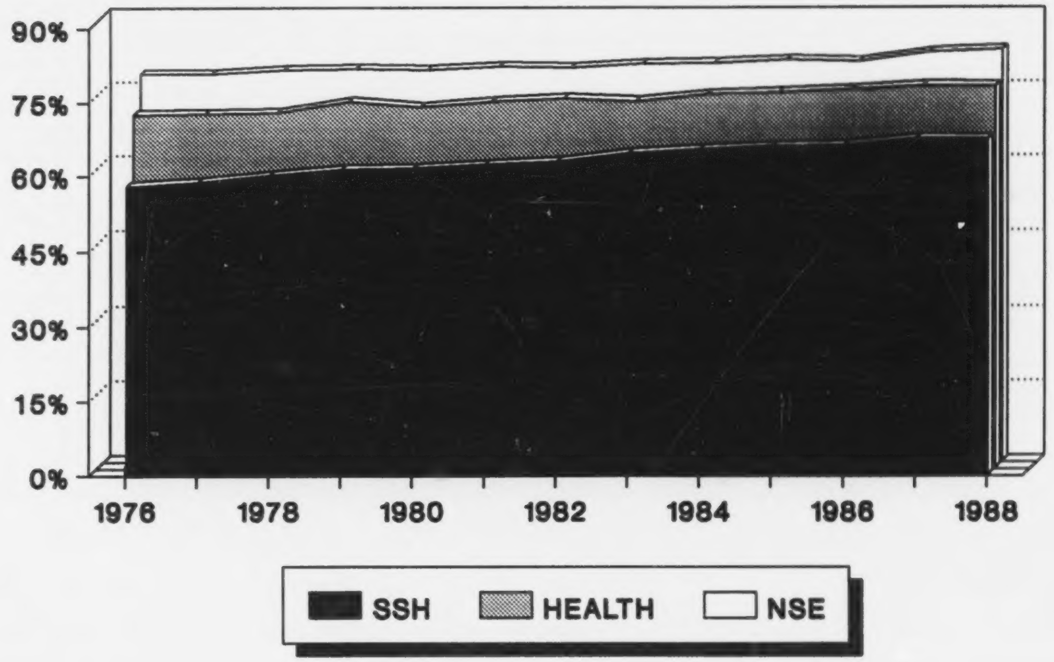
Faculty growth was above average in the fine arts, social sciences, and engineering/applied sciences, while growth in mathematics/physical sciences was just below average.

Over the same period, the number of female faculty increased 50%, while the number of male faculty rose 9%. Consequently, women accounted for 18.8% of the professoriate in 1988, up from 14.4% in 1976. The proportion of women increased in every field, but in some disciplines, they still constituted fewer than one out of every fifteen faculty members. For example, in 1988, just 2.9% of engineering faculty were women, and in mathematics/physical sciences the figure was only 6.3%. By contrast, in education, fine arts, humanities, and the health professions, about one out of four faculty members were female in 1988, up from one in five in 1976.

Distribution of Full-Time Faculty
by Highest Degree Earned and Field

	PhD %	MEDICAL %	MASTERS %	GRADUATE %	BACHELORS %	1st PROF %	UNDERGRAD %	NONE %	UNKNOWN %	TOTAL #
All Fields										
1976	60.0	5.0	25.3	0.5	6.8	0.5	0.4	0.8	0.8	31,648
1977	60.4	5.3	24.8	0.5	6.6	0.5	0.4	0.8	0.7	32,167
1978	61.0	5.6	24.4	0.5	6.4	0.5	0.4	0.8	0.3	32,645
1979	61.6	6.3	23.8	0.5	6.1	0.3	0.4	0.7	0.4	32,803
1980	61.6	6.2	23.7	0.5	5.9	0.3	0.4	0.6	0.9	33,299
1981	62.2	6.3	23.1	0.5	5.8	0.3	0.3	0.6	0.8	33,599
1982	62.5	6.5	22.8	0.5	5.7	0.3	0.3	0.6	0.9	34,078
1983	63.9	6.3	21.9	0.5	5.5	0.3	0.3	0.4	0.9	34,280
1984	64.3	6.5	21.7	0.4	5.3	0.3	0.2	0.5	0.7	34,665
1985	65.0	6.4	21.4	0.4	5.1	0.3	0.2	0.6	0.7	35,171
1986	65.0	6.5	21.1	0.4	5.1	0.3	0.2	0.6	0.8	35,373
1987	66.6	6.4	19.9	0.3	4.6	0.2	0.2	0.5	1.2	35,604
1988	66.6	6.4	19.9	0.4	4.5	0.3	0.3	0.5	1.2	36,386
Natural Sciences and Engineering										
1976	76.8	0.9	16.3	0.5	4.7	0.1	0.2	0.3	0.2	8,968
1977	76.9	0.9	16.0	0.3	4.7	0.2	0.2	0.4	0.5	8,996
1978	77.8	0.8	15.9	0.4	4.4	0.1	0.2	0.3	0.2	9,059
1979	77.9	0.9	15.6	0.3	4.5	0.1	0.2	0.3	0.2	9,109
1980	77.8	0.8	15.5	0.3	4.5	0.1	0.2	0.2	0.6	9,184
1981	78.5	0.7	15.2	0.3	4.3	0.1	0.2	0.3	0.4	9,184
1982	78.3	0.7	15.4	0.3	4.3	0.1	0.2	0.2	0.5	9,386
1983	79.1	0.7	14.8	0.3	4.2	0.1	0.2	0.2	0.4	9,432
1984	79.4	0.6	14.7	0.3	4.2	0.1	0.1	0.2	0.4	9,584
1985	80.0	0.6	14.4	0.3	4.0	0.1	0.2	0.3	0.2	9,814
1986	79.8	0.5	14.5	0.2	4.0	0.1	0.2	0.3	0.5	9,915
1987	81.7	0.5	13.1	0.2	3.4	0.1	0.2	0.2	0.6	10,007
1988	82.3	0.5	12.8	0.2	3.2	0.1	0.1	0.2	0.6	10,113
Social Sciences and Humanities										
1976	57.2	0.4	32.0	0.4	7.3	0.4	0.5	1.1	0.6	17,995
1977	58.1	0.4	31.3	0.4	7.0	0.4	0.5	1.1	0.8	18,373
1978	59.5	0.4	30.5	0.4	6.8	0.4	0.4	1.2	0.3	18,568
1979	60.8	0.4	29.6	0.4	6.5	0.4	0.4	1.1	0.3	18,459
1980	61.0	0.3	29.5	0.5	6.2	0.4	0.4	0.9	0.8	18,583
1981	61.8	0.3	28.8	0.5	6.3	0.4	0.4	0.9	0.7	18,645
1982	62.4	0.3	28.2	0.4	6.3	0.3	0.3	0.9	0.7	18,800
1983	64.1	0.3	27.3	0.5	5.9	0.4	0.3	0.7	0.7	18,821
1984	64.9	0.3	26.9	0.4	5.6	0.3	0.3	0.7	0.6	19,035
1985	65.5	0.3	26.4	0.4	5.3	0.3	0.3	0.8	0.7	19,319
1986	65.7	0.3	26.2	0.4	5.3	0.3	0.3	0.9	0.7	19,442
1987	67.2	0.3	25.1	0.4	4.8	0.3	0.3	0.8	0.9	19,501
1988	67.1	0.3	25.1	0.4	4.7	0.3	0.3	0.7	1.0	19,889
Health Professions										
1976	38.7	32.2	16.5	0.9	9.0	1.5	0.6	0.2	0.4	4,362
1977	37.2	33.9	16.7	0.9	8.7	1.5	0.6	0.2	0.4	4,495
1978	35.5	35.7	16.8	1.1	8.2	1.7	0.4	0.2	0.2	4,645
1979	35.1	38.5	16.8	0.9	7.5	0.4	0.4	0.1	0.3	4,791
1980	35.3	37.1	17.5	0.8	6.9	0.3	0.6	0.1	1.4	5,103
1981	36.0	37.6	17.2	0.7	6.4	0.3	0.3	0.1	1.4	5,207
1982	36.0	38.2	16.9	0.6	5.8	0.5	0.3	0.2	1.4	5,251
1983	37.5	36.1	16.5	0.7	6.5	0.5	0.5	0.1	1.5	5,522
1984	38.0	37.0	16.1	0.6	6.5	0.5	0.2	0.1	1.0	5,676
1985	38.6	36.8	16.3	0.6	6.2	0.4	0.3	0.2	0.6	5,748
1986	38.1	37.9	15.5	0.6	6.3	0.4	0.3	0.3	0.6	5,677
1987	39.6	37.2	14.9	0.5	5.9	0.3	0.3	0.1	1.2	5,701
1988	39.9	36.8	14.8	0.5	6.0	0.4	0.4	0.1	1.1	5,757

PROPORTION OF FULL-TIME FACULTY WITH PHD OR EQUIVALENT



The overall level of qualification of faculty increased at a steady pace from 1976 to 1988. The number of faculty with a doctoral degree or equivalent rose 29% from about 20,500 to 26,500, while the number holding less than a doctorate declined throughout most of this period. Consequently, by 1988, 73% of faculty held a PhD or equivalent, up from 65% in 1976. This trend underlines the extent to which the doctorate is becoming a prerequisite for a career in university teaching and research.

The level of qualification of faculty increased in all fields of study. In the social sciences and humanities (SSH), the number of professors with a doctorate rose by almost 30% over the 13 years. The corresponding increases were 20% in the natural sciences and engineering (NSE) and 42% in the health professions. This resulted in a narrowing of the differences in the level of qualification of faculty in these fields.

The discrepancies that remain are, in part, due to the relatively small number of PhDs granted by Canadian universities in some of the "professional" disciplines in the SSH and health sciences. If faculties of professional programs such as education/recreation, fine and applied arts, law, and business are excluded, the remaining SSH disciplines compare much more favourably with most NSE disciplines (in 1988, 78% held a PhD versus 83% in the NSE).

Similarly, when nursing, dentistry, and rehabilitative medicine are excluded from the health sciences, almost 90% of faculty in the remaining disciplines hold a PhD or equivalent.

Full-Time Faculty
by Rank

	Full Professor	Associate	Assistant	Other	Total
1976	7,925	10,985	8,939	3,799	31,648
1977	8,408	11,455	8,597	3,707	32,167
1978	8,855	12,118	8,144	3,528	32,645
1979	9,270	12,224	7,753	3,556	32,803
1980	9,804	12,550	7,367	3,578	33,299
1981	10,310	12,706	7,136	3,447	33,599
1982	11,054	12,899	6,890	3,235	34,078
1983	11,582	12,924	6,934	2,840	34,280
1984	11,959	12,984	6,946	2,776	34,665
1985	12,382	12,940	7,066	2,783	35,171
1986	12,589	12,737	7,121	2,926	35,373
1987	12,878	12,725	7,211	2,790	35,604
1988	13,115	12,701	7,510	3,060	36,386

Percentage Distribution

	%	%	%	%	%
1976	25.0	34.7	28.2	12.0	100.0
1977	26.1	35.6	26.7	11.5	100.0
1978	27.1	37.1	24.9	10.8	100.0
1979	28.3	37.3	23.6	10.8	100.0
1980	29.4	37.7	22.1	10.7	100.0
1981	30.7	37.8	21.2	10.3	100.0
1982	32.4	37.9	20.2	9.5	100.0
1983	33.8	37.7	20.2	8.3	100.0
1984	34.5	37.5	20.0	8.0	100.0
1985	35.2	36.8	20.1	7.9	100.0
1986	35.6	36.0	20.1	8.3	100.0
1987	36.2	35.7	20.3	7.8	100.0
1988	36.0	34.9	20.6	8.4	100.0

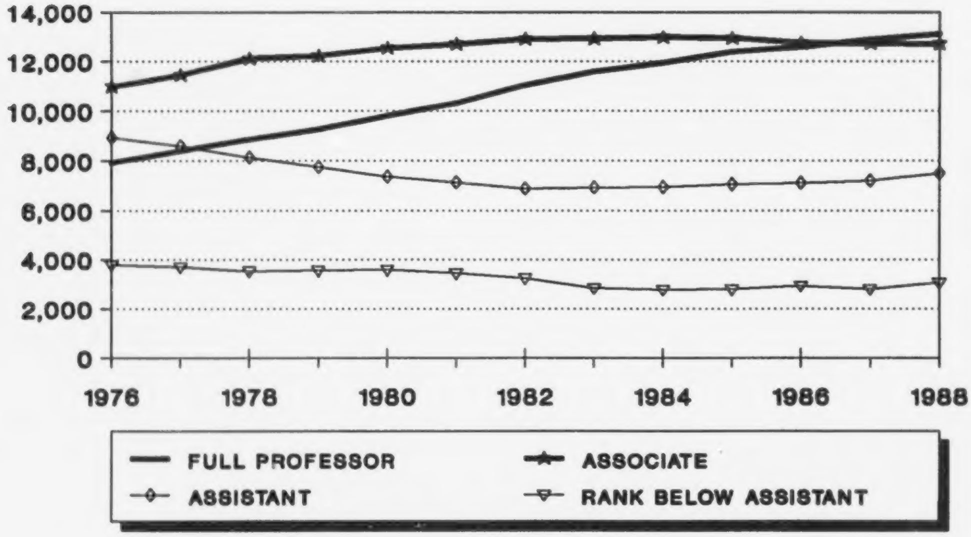
Proportion of Women

1976	4.3	10.8	19.7	33.7	14.4
1977	4.5	11.3	20.8	35.4	14.9
1978	4.7	11.9	21.4	35.1	14.8
1979	4.6	12.3	22.4	35.6	15.0
1980	4.9	12.7	24.1	36.9	15.5
1981	5.0	13.3	25.3	36.9	15.7
1982	5.3	14.1	26.6	39.0	16.1
1983	5.6	14.8	27.7	39.7	16.3
1984	5.7	15.4	28.0	40.2	16.6
1985	6.1	15.7	28.9	41.4	17.0
1986	6.4	16.5	29.4	41.7	17.6
1987	6.6	17.0	30.2	42.3	17.9
1988	7.0	17.6	31.4	43.2	18.8

Rate of Change, 1976 to 1988

	%	%	%	%	%
Female	167.7	88.6	34.1	3.2	49.6
Total	65.5	15.6	-16.0	-19.5	15.0

FULL-TIME FACULTY BY RANK



The total number of faculty at Canadian universities grew an average of 1.2% annually or 15% over the 1976 to 1988 period. This rate of growth did not prevail for all faculty ranks. In fact, at the end of this period, there were fewer faculty at the rank of assistant professor or lower than there had been at the beginning. However, these reductions took place during the late 1970s and early 1980s; since then, faculty at the two junior ranks have increased by about 10%.

On the other hand, from 1976 to 1988, the number of full professors rose 66%, and the number of associate professors, 16%. By 1988, full and associate professors accounted for over two-thirds of all faculty, compared with about half of faculty in 1976. Moreover, the number of associate professors peaked in 1984 and declined marginally in each of the next four years, while the number of full professors continued to rise.

The shifting rank distribution of faculty is at least partly explained by the relatively small growth in the total number of faculty vis-à-vis the 1960 to 1975 period when numbers quadrupled from 7,760 to 30,858. Slower growth (just 15% from 1976 to 1988) has limited the influx of "new" faculty. Given this stability, full-time professors have simply progressed through the ranks, with the result that a far greater proportion are in the senior levels. This shift, with the concomitant increase in remuneration, has caused some budgetary problems for Canadian universities, particularly at a time when additional resources are difficult to generate.

By 1988, women accounted for almost 19% of all faculty, up from 14% in 1976. As well, the largest proportional increases for women occurred in the senior ranks. There were, however, very few women in those ranks in 1976. Consequently, despite the growth, in 1988, only 7% of full professors and 18% of associates were women.

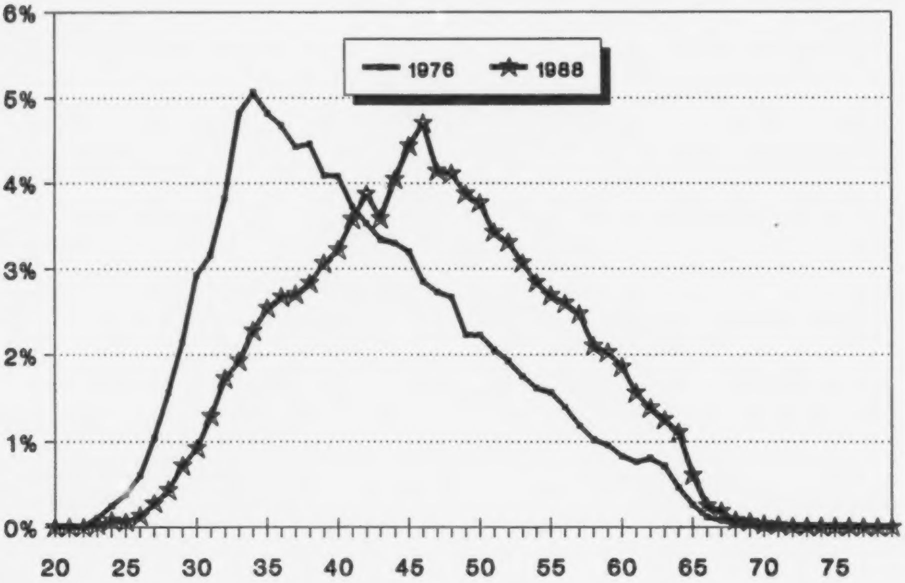
Age Distribution of Full-Time Faculty

Age	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Under 30	1,928	1,757	1,531	1,347	1,225	1,108	1,023	888	813	770	694	623	627
30	922	805	704	601	547	493	461	431	401	364	397	359	335
31	996	1,027	893	752	655	610	586	537	538	515	456	496	468
32	1,205	1,045	1,085	965	840	735	707	637	639	647	602	578	627
33	1,519	1,287	1,104	1,123	999	910	808	751	728	712	734	701	699
34	1,594	1,585	1,288	1,136	1,163	1,041	942	870	806	773	790	826	827
35	1,519	1,648	1,616	1,333	1,171	1,202	1,097	988	920	868	843	865	923
36	1,472	1,532	1,667	1,595	1,346	1,190	1,249	1,120	1,038	968	933	902	969
37	1,397	1,483	1,518	1,668	1,601	1,353	1,233	1,282	1,156	1,086	1,005	961	981
38	1,406	1,396	1,471	1,515	1,665	1,600	1,373	1,246	1,319	1,214	1,106	1,036	1,028
39	1,291	1,393	1,386	1,475	1,512	1,658	1,623	1,386	1,239	1,357	1,255	1,142	1,113
40	1,286	1,290	1,414	1,380	1,478	1,530	1,679	1,596	1,388	1,251	1,367	1,278	1,170
41	1,173	1,266	1,288	1,397	1,395	1,485	1,530	1,690	1,621	1,417	1,276	1,359	1,298
42	1,113	1,150	1,255	1,279	1,402	1,381	1,500	1,547	1,679	1,617	1,447	1,274	1,405
43	1,054	1,096	1,158	1,261	1,279	1,406	1,404	1,489	1,549	1,685	1,616	1,450	1,302
44	1,041	1,031	1,098	1,141	1,269	1,281	1,402	1,403	1,499	1,547	1,703	1,603	1,469
45	1,009	1,025	1,061	1,079	1,156	1,275	1,281	1,407	1,406	1,499	1,523	1,706	1,611
46	900	1,008	1,018	1,048	1,085	1,160	1,257	1,276	1,381	1,407	1,495	1,515	1,707
47	861	889	1,029	1,012	1,050	1,084	1,153	1,249	1,263	1,369	1,405	1,493	1,503
48	842	851	884	1,006	1,004	1,029	1,075	1,139	1,238	1,266	1,373	1,389	1,492
49	704	826	832	885	999	1,003	1,025	1,068	1,136	1,239	1,258	1,355	1,407
50	703	693	822	825	886	994	1,000	1,014	1,068	1,131	1,227	1,249	1,367
51	649	702	696	816	831	874	986	992	1,002	1,057	1,110	1,204	1,245
52	607	645	712	687	820	826	870	981	986	996	1,054	1,115	1,202
53	552	611	636	710	682	803	829	851	979	983	987	1,041	1,114
54	510	543	611	632	705	673	809	826	838	975	975	990	1,031
55	494	507	539	596	634	692	662	793	823	829	939	963	976
56	441	489	496	531	589	629	688	650	789	814	864	922	942
57	372	431	487	490	527	591	618	673	651	776	786	784	897
58	322	358	421	478	504	515	577	619	664	641	747	761	762
59	302	318	351	416	475	484	517	564	608	649	615	714	736
60	263	288	309	340	410	467	465	505	553	594	610	589	675
61	242	263	281	295	330	391	443	448	486	519	542	562	567
62	255	238	254	263	286	317	364	421	422	463	478	497	504
63	226	241	222	232	252	274	302	345	397	401	407	436	454
64	147	213	236	205	222	241	266	287	314	374	368	363	400
65	83	86	116	133	115	135	131	150	160	188	209	226	221
Over 65	110	114	108	98	111	104	111	124	143	188	197	228	238
Unknown	138	37	48	58	79	55	32	37	25	22	40	49	94
Total	31,648	32,167	32,645	32,803	33,299	33,599	34,078	34,280	34,665	35,171	35,373	35,604	36,386

Percentage Distribution

	%	%	%	%	%	%	%	%	%	%	%	%	%
Under 30	6.1	5.5	4.7	4.1	3.7	3.3	3.0	2.6	2.3	2.2	2.0	1.7	1.7
30 to 34	19.7	17.9	15.5	14.0	12.6	11.3	10.3	9.4	9.0	8.6	8.4	8.3	8.1
35 to 39	22.4	23.2	23.5	23.1	21.9	20.8	19.3	17.6	16.4	15.6	14.5	13.8	13.8
40 to 44	17.9	18.1	19.0	19.7	20.5	21.1	22.1	22.5	22.3	21.4	20.9	19.6	18.3
45 to 49	13.6	14.3	14.8	15.3	15.9	16.5	17.0	17.9	18.5	19.3	19.9	20.9	21.2
50 to 54	9.5	9.9	10.7	11.2	11.8	12.4	13.2	13.6	14.1	14.6	15.1	15.7	16.4
55 to 59	6.1	6.5	7.0	7.7	8.2	8.7	9.0	9.6	10.2	10.5	11.0	11.6	11.9
60 to 64	3.6	3.9	4.0	4.1	4.5	5.0	5.4	5.9	6.3	6.7	6.8	6.9	7.1
Over 64	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.9	1.1	1.1	1.3	1.3
Unknown	0.4	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.3
Average Age	41.4	41.8	42.4	42.9	43.4	43.9	44.3	44.8	45.3	45.7	46.0	46.3	46.5

AGE DISTRIBUTION OF FULL-TIME FACULTY 1976 AND 1988



The age distribution of full-time faculty is affected by three factors: faculty growth; attrition rates at each age; and the age distribution of new faculty. In 1976, the age distribution was skewed toward the younger ages. This reflected the rapid expansion of the Canadian university system in the 1960s and early 1970s. Thereafter, faculty growth slowed, averaging only 1.2% per year.

The age distribution of new appointments also contributed to the "aging" process during this period. For example, the number of new professors aged less than 30 decreased dramatically, while the number aged 35 to 44 increased. Consequently, the proportion of faculty under age 35 fell from 26% in 1976 to under 10% in 1988.

On the other hand, attrition tended to slow the aging process somewhat. Retiring faculty and the large number who left academe for other reasons were generally replaced by younger people (even in 1988, 70% of new appointments were under age 40).

Nonetheless, Canadian faculty did age considerably between 1976 and 1988. Overall, the average age of full-time faculty increased from 41.4 to 46.5. The proportion aged 45 and over rose from 34% to 58%. In fact, the proportion in the 55-64 age group almost doubled, rising from 9.7% to 19%. However, the pace at which faculty are aging is slowing down. Between 1984 and 1988 the average age of faculty increased at about half the rate experienced during the previous eight-year period. This does not mean to imply that the growing number of retirements is not of concern to universities. In the short term, departures due to retirement may become even significant.

Faculty Attrition by Age Group

	Under 35	35-44	45-54	55-59	60-64	Over 64	Total
1976	250	441	198	65	105	87	1,146
1977	353	333	134	55	141	94	1,110
1978	307	408	191	58	180	130	1,274
1979	297	354	129	36	141	126	1,083
1980	255	398	175	67	153	127	1,175
1981	122	267	154	66	192	135	936
1982	202	310	186	68	199	121	1,086
1983	57	291	186	54	236	133	957
1984	111	191	131	87	237	121	878
1985	137	336	241	176	353	183	1,426
1986	129	368	217	148	329	179	1,370
1987	23	174	182	163	314	221	1,077

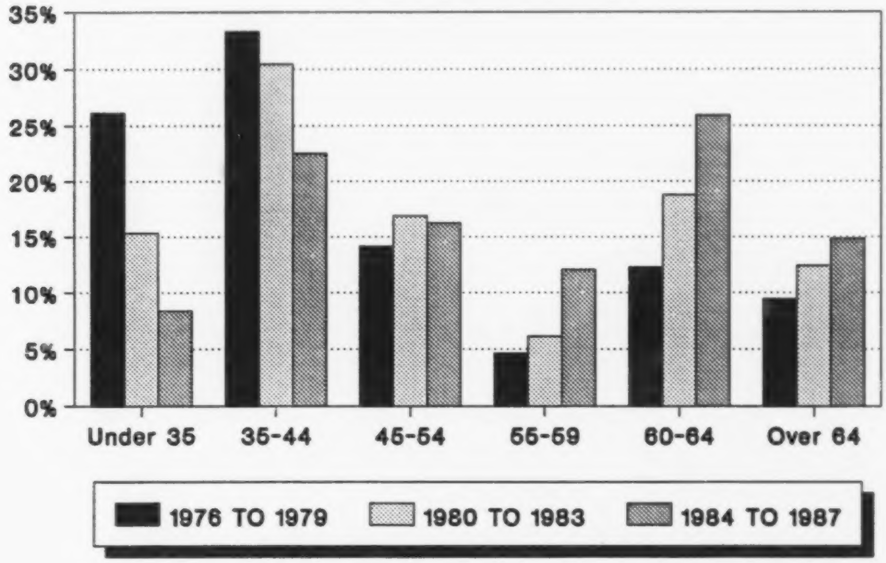
Percentage Distribution

	%	%	%	%	%	%	%
1976	21.8	38.5	17.3	5.7	9.2	7.6	100.0
1977	31.8	30.0	12.1	5.0	12.7	8.5	100.0
1978	24.1	32.0	15.0	4.6	14.1	10.2	100.0
1979	27.4	32.7	11.9	3.3	13.0	11.6	100.0
1980	21.7	33.9	14.9	5.7	13.0	10.8	100.0
1981	13.0	28.5	16.5	7.1	20.5	14.4	100.0
1982	18.6	28.5	17.1	6.3	18.3	11.1	100.0
1983	6.0	30.4	19.4	5.6	24.7	13.9	100.0
1984	12.6	21.8	14.9	9.9	27.0	13.8	100.0
1985	9.6	23.6	16.9	12.3	24.8	12.8	100.0
1986	9.4	26.9	15.8	10.8	24.0	13.1	100.0
1987	2.1	16.2	16.9	15.1	29.2	20.5	100.0

Average Distribution

	%	%	%	%	%	%	%
1976 to 1979	26.2	33.3	14.1	4.6	12.3	9.5	100.0
1980 to 1983	15.3	30.5	16.9	6.1	18.8	12.4	100.0
1984 to 1987	8.4	22.5	16.2	12.1	26.0	14.8	100.0

DISTRIBUTION OF FACULTY ATTRITION BY AGE GROUP



Assuming that all departures after age 59 are due to retirement, it is somewhat of a surprise that the majority of departures occur for reasons other than retirement. For example, before 1980, 60% of departing full-time faculty were younger than age 45.

The rate at which younger faculty leave the profession raises the issue of faculty retention. Remuneration may be partially responsible for the limited capacity of universities to retain younger faculty. The Follow-up to the 1982 Graduates Survey, carried out by Statistics Canada and Employment and Immigration Canada, revealed that the average salary of PhD graduates working in the university environment was well below the average for employed PhDs.

But while retirement may not be the major cause of attrition, its growing importance cannot be disregarded. The estimated number of retirements more than doubled between 1977 and 1987. And although the number of departures varies considerably from year to year, comparisons of different periods illustrate the growing importance of retirements: they accounted for about 22% of attrition from 1976 to 1979, and for 41% from 1984 to 1987.

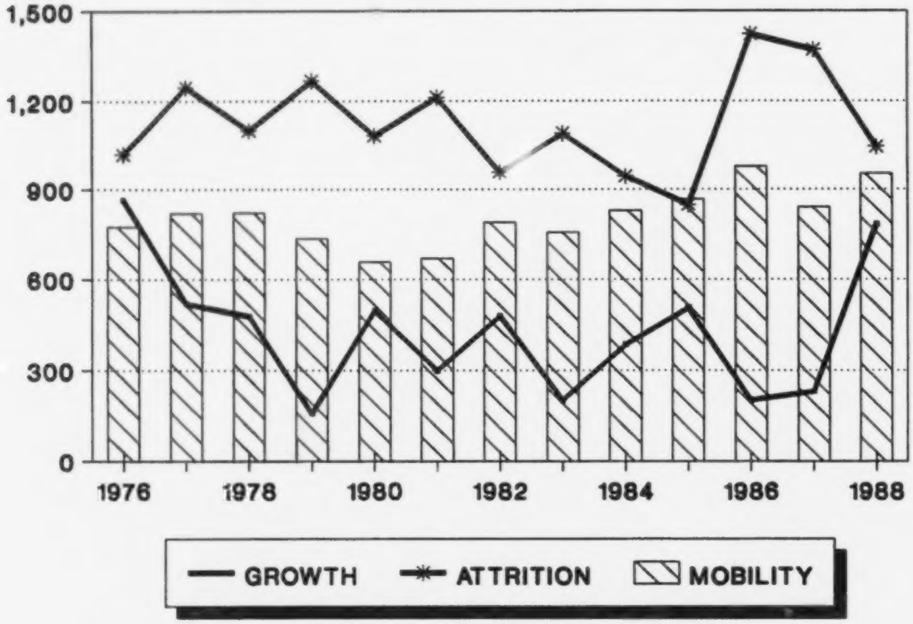
However, comparing the number of departures to the total faculty complement in each age group revealed that growth in the number of faculty reaching the age of retirement eligibility is primarily responsible for the growth in the number of retirements. Attrition rates for faculty aged 55 to 64 were somewhat higher after 1985 than previously and somewhat lower for those over age 64. But the number of faculty in these age groups virtually doubled between 1976 and 1988, and it was this growth that explains the growth in retirements. The relative importance of attrition in the younger age groups fell as both attrition rates in the those age groups and the proportion of faculty under age 45 declined in the latter part of the 1980s.

Full-time Appointments
by Growth, Attrition and Inter-University Mobility

	Growth	Attrition	Sub-total New Recruits	Inter-university Mobility	Total Appointments
1976	864	1,020	1,884	775	2,659
1977	519	1,247	1,766	819	2,585
1978	478	1,102	1,580	820	2,400
1979	158	1,268	1,426	734	2,160
1980	496	1,084	1,580	658	2,238
1981	300	1,213	1,513	670	2,183
1982	479	959	1,438	789	2,227
1983	202	1,092	1,294	756	2,050
1984	385	945	1,330	828	2,158
1985	506	848	1,354	866	2,220
1986	202	1,422	1,624	979	2,603
1987	231	1,371	1,602	841	2,443
1988	782	1,046	1,828	954	2,782

Percentage Distribution

	%	%	%	%	%
1976	32.5	38.4	70.9	29.1	100.0
1977	20.1	48.2	68.3	31.7	100.0
1978	19.9	45.9	65.8	34.2	100.0
1979	7.3	58.7	66.0	34.0	100.0
1980	22.2	48.4	70.6	29.4	100.0
1981	13.7	55.6	69.3	30.7	100.0
1982	21.5	43.1	64.6	35.4	100.0
1983	9.9	53.3	63.1	36.9	100.0
1984	17.8	43.8	61.6	38.4	100.0
1985	22.8	38.2	61.0	39.0	100.0
1986	7.8	54.6	62.4	37.6	100.0
1987	9.5	56.1	65.6	34.4	100.0
1988	28.1	37.6	65.7	34.3	100.0



FULL-TIME APPOINTMENTS

The number of full-time appointments made during a year provides a measure of aggregate faculty demand. After a decline in the late 1970s, the annual number of appointments settled at approximately 2,200 (6.4% of total full-time faculty) through the first half of the 1980s. Numbers rose almost steadily thereafter and by 1986 reached the level of the late 1970s.

Universities report as "full-time appointments" any position filled within the university from outside the institution. The position may be a newly created one or a vacancy created by someone leaving the university. Thus "full-time appointments" does not reflect the number of new recruits entering the university system. Of the full-time appointments made between 1976 and 1988, on average, only about two-thirds resulted from faculty growth and attrition in the university system as a whole; the remaining one-third represent the movement of full-time faculty between Canadian institutions.

While growth accounted for a relatively small proportion of new appointments (on average, 1.2% annually), it was responsible for a significant proportion of the new recruits to academe: on average, 25% over the period. Attrition, for all reasons, accounted for the remaining 75% of additions to faculty ranks.

Despite stable labour market conditions, between 1976 and 1986, universities had a total influx of 16,789 new full-time faculty members, excluding those moving from one Canadian university to another. Over this decade, as a result of attrition and growth, universities renewed the equivalent of 53% of their full-time academic staff complement in 1976.

Inter-institutional Mobility of Senior Faculty
(Full and Associate)
by Region, Total 1984 to 1988

	Remaining in region	Moving to other regions	Total	Recruited from other regions	Net gain (loss)
Atlantic	25	68	93	48	(20)
Quebec	103	55	158	41	(14)
Ontario	191	82	273	157	75
West	99	108	207	67	(41)
Canada	418	313	731	313	0

Percentage

	%	%	%	%
Atlantic	26.9	73.1	12.7	15.3
Quebec	65.2	34.8	21.6	13.1
Ontario	70.0	30.0	37.3	50.2
West	47.8	52.2	28.3	21.4
Canada	57.2	42.8	100.0	100.0

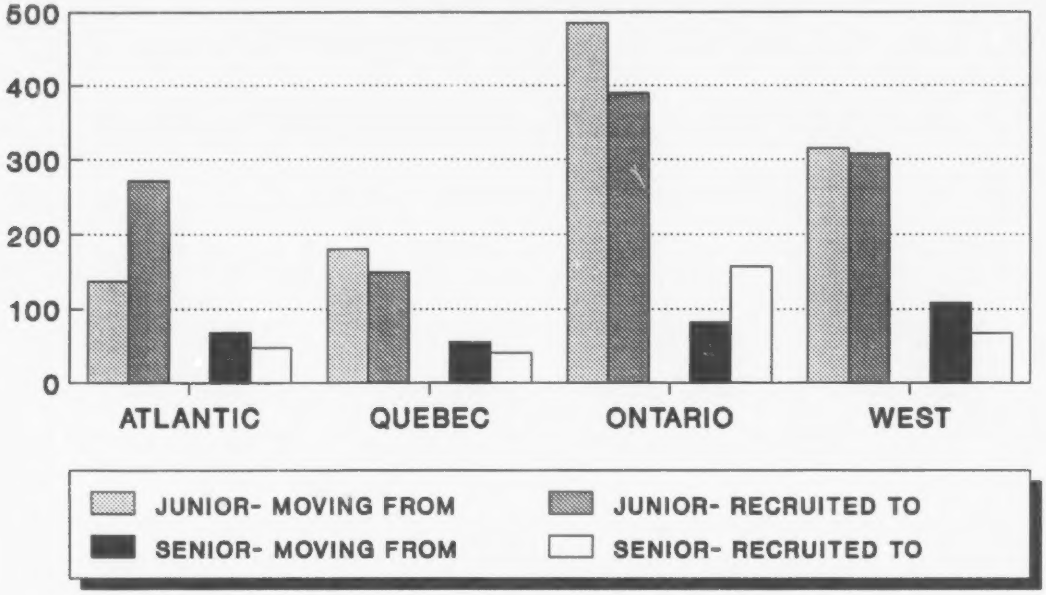
Inter-institutional Mobility of Junior Faculty
(Assistant and Lower)
by Region, Total 1984 to 1988

	Remaining in region	Moving to other regions	Total	Recruited from other regions	Net gain (loss)
Atlantic	207	138	345	271	133
Quebec	430	181	611	150	(31)
Ontario	1,106	485	1,591	390	(95)
West	562	315	877	308	(7)
Canada	2,305	1,119	3,424	1,119	0

Percentage

	%	%	%	%
Atlantic	60.0	40.0	10.1	24.2
Quebec	70.4	29.6	17.8	13.4
Ontario	69.5	30.5	46.5	34.9
West	64.1	35.9	25.6	27.5
Canada	67.3	32.7	100.0	100.0

INTER-INSTITUTIONAL MOBILITY BETWEEN REGIONS, BY RANK TOTAL 1984 TO 1988



The vast majority of faculty moving between Canadian universities are in the junior ranks of Assistant Professor and lower. These faculty members accounted for approximately 80% of faculty mobility in the 1984 to 1988 period. Both junior and senior faculty generally move between institutions in the same region, but there are significant regional variations.

In the Atlantic provinces, in marked contrast to mobility patterns in other regions, the majority of senior faculty who change institutions (73%) accept a position in another region. This may include some junior faculty who have been promoted from a junior rank in the Atlantic to a senior rank in another region. The region also is the only region with a net gain in junior faculty. Clearly the recruitment and retention practices are different for universities in the Atlantic region than elsewhere in the country.

By comparison, Ontario universities tend both to retain their senior faculty (70%) and to attract almost twice as many senior faculty as they lose to other regions of the country. By contrast Ontario universities both consume and supply about two-thirds of junior faculty who change institutions. Ontario universities therefore appear to be a "breeding" ground of junior faculty for other regions of Canada.

Despite the large number of faculty at Quebec universities, these institutions recruit the fewest number of faculty from other regions. This "unequal exchange" most likely results from the fact that relatively few anglophone Canadians are capable of teaching in French. Quebec francophone universities therefore must rely on their own provincial market or on the international market to fill their faculty needs.

New Full-Time Recruits
by Previous Employment Sector

	Students[1] in Canada	Unknown[2]	International[3] Market	Other Canadian[4] Markets	Total
1976	275	426	710	473	1,884
1977	276	281	686	523	1,766
1978	284	186	546	564	1,580
1979	234	247	475	470	1,426
1980	209	283	509	579	1,580
1981	157	348	484	524	1,513
1982	189	290	489	470	1,438
1983	179	246	430	439	1,294
1984	228	181	479	442	1,330
1985	227	242	417	468	1,354
1986	239	414	491	480	1,624
1987	241	388	489	484	1,602
1988	245	568	521	494	1,828

Percentage Distribution

	%	%	%	%	%
1976	14.6	22.6	37.7	25.1	100.0
1977	15.6	15.9	38.8	29.6	100.0
1978	18.0	11.8	34.6	35.7	100.0
1979	16.4	17.3	33.3	33.0	100.0
1980	13.2	17.9	32.2	36.6	100.0
1981	10.4	23.0	32.0	34.6	100.0
1982	13.1	20.2	34.0	32.7	100.0
1983	13.8	19.0	33.2	33.9	100.0
1984	17.1	13.6	36.0	33.2	100.0
1985	16.8	17.9	30.8	34.6	100.0
1986	14.7	25.5	30.2	29.6	100.0
1987	15.0	24.2	30.5	30.2	100.0
1988	13.4	31.1	28.5	27.0	100.0

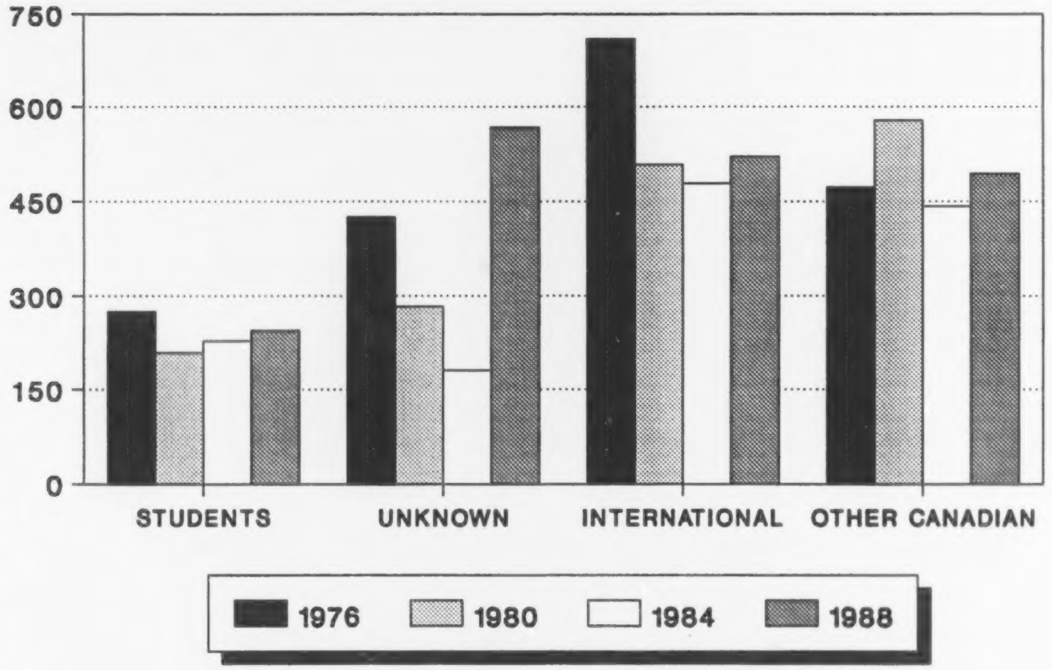
[1] Students attending Canadian universities who are either Canadian citizens or permanent residents.

[2] Unknown.

[3] Recruitment on the international market (outside Canada) including foreign students in Canada who are not permanent residents. This also includes the recruitment of Canadians on the international market.

[4] Recruits from other employment sectors in Canada.

NEW FULL-TIME RECRUITS BY PREVIOUS EMPLOYMENT SECTOR



Studies of the recruitment practices of Canadian universities have focused largely on faculty citizenship, whereas, the professional experience of new academic staff has been almost entirely ignored. It has also been assumed that PhD students constitute the principal source of new faculty, with other labour markets in Canada and abroad playing a secondary role. However, analysis of the sectors from which new faculty have been recruited reveals that sources of supply were more diverse than has been assumed.

On average, 15% of new faculty were Canadian citizens recruited directly from the student market (including postdoctoral fellows) in Canada. Another 33% of new faculty were recruited from Canada's private and public sectors, while almost as many (32%) came from the international market. The employment experience of the remaining 20% of new appointees was not known.

But the relative insignificance of the student market is more apparent than real. A substantial number of recruits were recent graduates with non-academic labour market experience. Indeed, over half of new faculty hired between 1976 and 1988 were aged 35 or less.

Canadian universities also have depended heavily on international sources to fill their needs for academic staff. However, such recruitment cannot be construed as hiring foreign nationals. On average, Canadian citizens accounted for 40% of hiring on the international market between 1976 and 1988. Furthermore, this proportion had risen during the late 1980s.

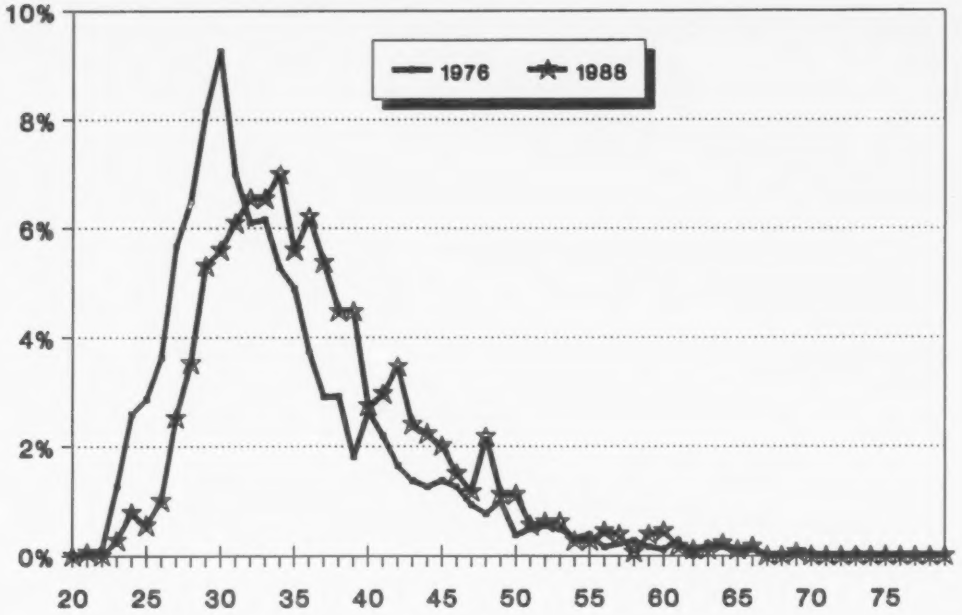
Age Distribution of New Full-Time Recruits

Age	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Under 30	560	519	450	392	389	356	313	275	240	252	249	255	251
30	168	157	117	101	102	105	79	79	90	81	107	101	100
31	127	141	126	98	85	89	101	93	97	102	95	111	109
32	111	100	109	110	117	92	102	101	99	106	132	116	117
33	112	98	88	97	105	100	90	69	98	96	96	111	117
34	96	112	82	76	92	97	69	90	66	79	100	112	125
35	89	102	94	75	79	75	83	68	70	86	93	92	100
36	68	60	58	51	71	82	76	65	66	66	92	95	111
37	53	57	52	59	66	61	69	65	72	58	77	64	96
38	53	45	43	46	60	62	63	50	71	66	48	70	80
39	33	40	36	39	48	40	55	40	36	47	71	56	80
40	48	36	46	24	41	46	46	32	36	38	50	58	49
41	40	27	30	34	39	40	31	39	36	38	48	52	53
42	30	24	28	21	16	29	40	37	33	30	56	44	62
43	25	25	19	30	22	26	32	25	32	22	40	33	43
44	23	23	22	15	25	30	23	14	35	33	43	31	40
45	25	14	21	8	25	23	20	19	21	26	32	25	36
46	23	22	17	18	22	13	17	14	11	19	25	22	27
47	17	17	23	10	19	19	13	16	20	12	23	19	21
48	14	21	12	9	19	8	11	8	13	9	19	20	39
49	18	10	11	9	15	12	14	7	13	10	13	10	20
50	7	12	10	16	9	14	9	10	7	6	15	11	20
51	9	12	12	10	13	5	8	12	9	5	13	8	10
52	10	9	11	8	15	7	5	8	6	10	8	15	11
53	9	12	12	10	6	6	10	4	8	3	6	6	11
54	6	13	6	10	4	6	5	7	5	5	9	5	5
55	7	8	6	7	3	5	6	4	5	7	11	8	5
56	3	4	10	3	3	7	6	6	9	7	7	8	8
57	4	5	3	6	6	6	1	2	6	9	6	7	7
58	5	2	1	3	16	4	1	3	2	6	10	3	1
59	3	5	2	3	3	3	4	2	2	3	3	4	7
60	2	2	0	4	2	4	8	4	1	1	3	5	8
61	5	5	3	1	3	2	0	8	3	4	1	4	3
62	0	4	0	1	3	5	1	0	3	2	3	0	2
63	4	3	1	1	3	1	2	1	2	3	0	1	2
64	3	1	1	2	1	2	3	1	1	1	1	2	4
65	1	0	2	1	1	1	2	0	0	0	1	1	2
Over 65	5	6	2	3	6	4	5	2	2	5	4	1	4
Unknown	68	13	14	15	26	26	15	14	4	1	14	16	42
Total	1,884	1,766	1,580	1,426	1,580	1,513	1,438	1,294	1,330	1,354	1,624	1,602	1,828
Average Age	33.9	34.1	34.2	34.3	35.1	35.0	35.3	35.2	35.6	35.6	36.3	35.9	36.7

Percentage Distribution

	%	%	%	%	%	%	%	%	%	%	%	%	%
Under 30	29.7	29.4	28.5	27.5	24.6	23.5	21.8	21.3	18.0	18.6	15.3	15.9	13.7
30 to 34	32.6	34.4	33.0	33.8	31.7	31.9	30.7	33.4	33.8	34.3	32.6	34.4	31.1
35 to 39	15.7	17.2	17.9	18.9	20.5	21.2	24.1	22.3	23.7	23.9	23.5	23.5	25.5
40 to 44	8.8	7.6	9.2	8.7	9.1	11.3	12.0	11.4	12.9	11.9	14.5	13.6	13.5
45 to 49	5.1	4.8	5.3	3.8	6.3	5.0	5.2	4.9	5.9	5.6	6.9	6.0	7.8
50 to 54	2.2	3.3	3.2	3.8	3.0	2.5	2.6	3.2	2.6	2.1	3.1	2.8	3.1
55 to 59	1.2	1.4	1.4	1.5	2.0	1.7	1.3	1.3	1.8	2.4	2.3	1.9	1.5
60 to 64	0.7	0.8	0.3	0.6	0.8	0.9	1.0	1.1	0.8	0.8	0.5	0.7	1.0
Over 64	0.3	0.3	0.3	0.3	0.4	0.3	0.5	0.2	0.2	0.4	0.3	0.1	0.3
Unknown	3.6	0.7	0.9	1.1	1.6	1.7	1.0	1.1	0.3	0.1	0.9	1.0	2.3

AGE DISTRIBUTION OF NEW FULL-TIME RECRUITS, 1976 AND 1988



A substantial proportion of new faculty appointed to full-time positions tend to be relatively young. Indeed, over half of new faculty hired from 1976 to 1988 were younger than age 35. However, recruits younger than age 30 represented a declining proportion of recruits, falling from almost 30% of all appointees in 1976 to fewer than 14% in 1988.

On the other hand, growth in the proportion of appointees in the 35-39 age group almost mirrored the declines among those aged 30. There was also a substantial increase in the proportion of new recruits aged 40 to 44: from under 9% in 1976 to an average of about 14% between 1986 and 1988. In addition, 14% of new recruits were aged 45 or older in 1988, up from under 10% in 1976. As a result of these shifts, the average age of new recruits rose from 33.9 years in 1976 to 36.7 in 1988.

The increased age of new entrants into the profession cannot be readily explained. It may reflect the aging of PhD graduates as a result of the increasing time taken to complete postsecondary studies. It may also be due to higher qualifications (i.e., post-doctoral study, internships, etc.) required to enter the profession. In any event, the net result has been to exacerbate the problem of an aging professoriate.

FINANCE

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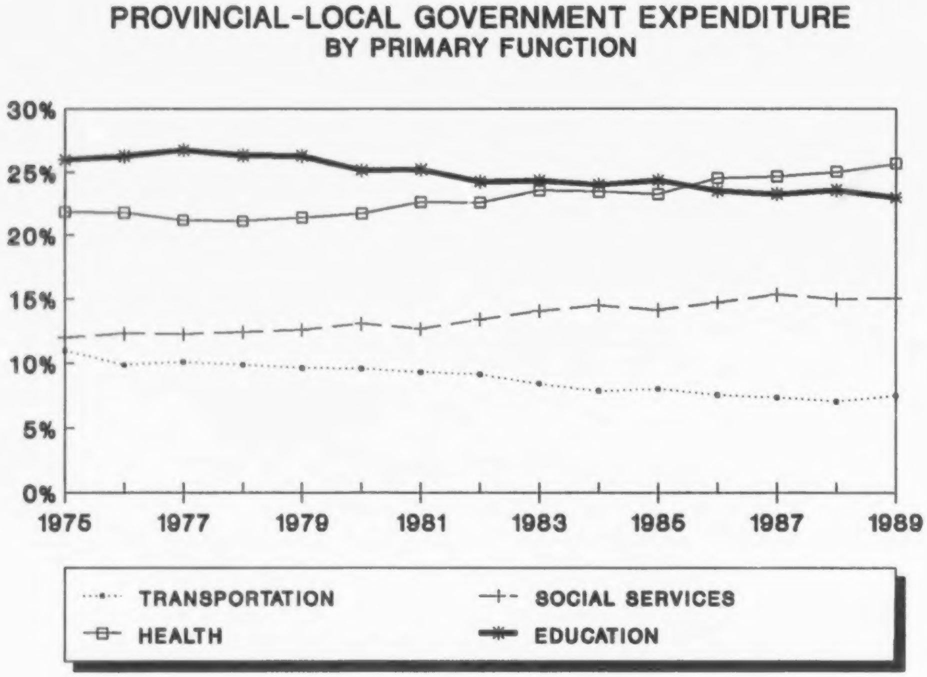
Consolidated Government Finance
Provincial-Local Government Expenditure
by Primary Function ($ '000)

	GENERAL SERVICES	PROTECTION OF PERSONS/ PROPERTY	TRANSPORTATION AND COMMUNICATIONS	HEALTH	SOCIAL SERVICES	EDUCATION	RESOURCE CONSERVATION INDUSTRIAL DEVELOPMENT	ENVIRONMENT	RECREATION/ CULTURE	REGIONAL PLANNING/ DEVELOPMENT	DEBT CHARGES	OTHER EXPENDITURES	GROSS GENERAL EXPENDITURE	GROSS GENERAL EXPENDITURE LESS DEBT CHARGES
1975	2,629,685	2,416,315	4,391,231	8,742,163	4,791,211	10,405,600	1,762,756	1,675,573	1,452,070	211,819	2,970,796	1,534,142	42,983,361	40,012,565
1976	3,025,312	2,840,141	4,474,481	9,883,703	5,583,567	11,936,787	2,132,713	2,025,374	1,593,442	231,599	3,431,830	1,658,110	48,817,059	45,385,229
1977	3,690,785	3,027,811	5,108,533	10,717,455	6,201,637	13,551,238	2,351,614	2,224,999	1,854,550	500,948	4,090,806	1,385,619	54,705,995	50,615,189
1978	3,934,967	3,295,063	5,490,386	11,739,546	6,886,008	14,655,408	2,890,404	2,407,936	1,999,081	749,570	4,992,854	1,576,137	60,617,360	55,624,506
1979	4,770,238	3,583,573	5,882,239	13,121,416	7,720,090	16,151,878	3,302,139	2,473,371	2,151,045	666,263	5,669,307	1,564,145	67,055,704	61,386,397
1980	5,253,939	4,134,825	6,750,220	15,322,880	9,219,628	17,776,482	4,0[illegible]3,314	2,952,046	2,565,240	693,737	6,670,315	1,916,890	77,299,516	70,629,201
1981	5,890,991	4,835,466	7,519,179	18,359,678	10,244,386	20,474,839	4,6[illegible]7,052	3,103,773	2,776,170	780,588	7,952,805	2,448,832	89,073,759	81,120,954
1982	7,027,943	5,416,576	8,535,435	21,137,852	12,514,039	22,696,724	6,2[illegible],501	3,193,735	3,266,314	829,989	9,918,502	2,747,476	103,495,086	93,576,584
1983	7,235,084	5,762,823	8,382,013	23,536,005	14,026,063	24,316,148	6,1[illegible],105	3,265,943	3,329,698	787,625	10,824,442	3,129,601	110,766,550	99,942,108
1984	7,243,377	6,151,911	8,208,614	24,497,486	15,123,706	25,079,559	6,6[illegible],790	3,468,308	3,511,835	871,320	13,216,535	3,688,465	117,741,906	104,525,371
1985	7,620,271	6,524,544	9,161,710	26,553,462	16,116,049	27,831,418	7,9[illegible],542	3,784,371	3,839,382	904,888	14,824,966	4,063,528	129,137,131	114,312,165
1986	7,846,585	7,082,825	9,058,317	29,467,741	17,673,419	28,242,397	7,8[illegible],676	3,965,102	3,969,191	831,088	15,968,021	4,183,229	136,177,591	120,209,570
1987	9,471,861	7,701,464	9,339,235	31,433,345	19,491,868	29,631,027	6,8[illegible],031	4,327,413	4,237,951	875,959	17,404,453	4,115,339	144,882,946	127,478,493
1988	9,356,857	8,162,967	9,575,316	34,188,532	20,412,735	32,198,063	7,9[illegible],348	4,959,687	4,390,948	939,014	18,261,293	4,458,332	154,873,092	136,611,799
1989	9,960,181	8,650,038	10,968,604	37,682,076	22,007,560	33,719,250	7,2[illegible],774	5,856,309	4,876,601	1,152,232	19,223,174	4,617,082	165,940,881	146,717,707

PERCENTAGE DISTRIBUTION

	GENERAL SERVICES	PROTECTION OF PERSONS/ PROPERTY	TRANSPORTATION AND COMMUNICATIONS	HEALTH	SOCIAL SERVICES	EDUCATION	RESOURCE CONSERVATION INDUSTRIAL DEVELOPMENT	ENVIRONMENT	RECREATION/ CULTURE	REGIONAL PLANNING/ DEVELOPMENT	DEBT CHARGES	OTHER EXPENDITURES	GROSS GENERAL EXPENDITURE	GROSS GENERAL EXPENDITURE LESS DEBT CHARGES
	%	%	%	%	%	%	%	%	%	%		%		%
1975	6.6	6.0	11.0	21.8	12.0	26.0	4.4	4.2	3.6	0.5		3.8		100.0
1976	6.7	6.3	9.9	21.8	12.3	26.3	4.7	4.5	3.5	0.5		3.7		100.0
1977	7.3	6.0	10.1	21.2	12.3	26.8	4.6	4.4	3.7	1.0		2.7		100.0
1978	7.1	5.9	9.9	21.1	12.4	26.3	5.2	4.3	3.6	1.3		2.8		100.0
1979	7.8	5.8	9.6	21.4	12.6	26.3	5.4	4.0	3.5	1.1		2.5		100.0
1980	7.4	5.9	9.6	21.7	13.1	25.2	5.7	4.2	3.6	1.0		2.7		100.0
1981	7.3	6.0	9.3	22.6	12.6	25.2	5.8	3.8	3.4	1.0		3.0		100.0
1982	7.5	5.8	9.1	22.6	13.4	24.3	6.6	3.4	3.5	0.9		2.9		100.0
1983	7.2	5.8	8.4	23.5	14.0	24.3	6.2	3.3	3.3	0.8		3.1		100.0
1984	6.9	5.9	7.9	23.4	14.5	24.0	6.4	3.3	3.4	0.8		3.5		100.0
1985	6.7	5.7	8.0	23.2	14.1	24.3	6.9	3.3	3.4	0.8		3.6		100.0
1986	6.5	5.9	7.5	24.5	14.7	23.5	6.6	3.3	3.3	0.7		3.5		100.0
1987	7.4	6.0	7.3	24.7	15.3	23.2	5.4	3.4	3.3	0.7		3.2		100.0
1988	6.8	6.0	7.0	25.0	14.9	23.6	5.8	3.6	3.2	0.7		3.3		100.0
1989	6.8	5.9	7.5	25.7	15.0	23.0	4.9	4.0	3.3	0.8		3.1		100.0


PROVINCIAL-LOCAL GOVERNMENT EXPENDITURE
BY PRIMARY FUNCTION

The system of consolidated government financal statistics allocates all government expenditures to their primary functions, thereby facilitating comparisons between those functions. According to this methodology provincial-local government expenditure on all levels of education amounted to some $33.7 billion in 1989.

From 1975 to 1979, provincial-local governments spent about 26% of their budgets (net of debt charges) on education. But, during the 1980s, that proportion declined steadily to 23% by 1989, as the proportion of government expenditures on health and social services increased. Transportation expenditures also declined as a proportion of expenditures while the other expenditure categories basically maintained their relative spending priority.

If education had maintained a 26% share of expenditures, provincial-local government spending on this function would have been $4.4 billion higher in 1989. Over the decade, the total cost to the education sector of the change in spending priorities was about $23 billion.

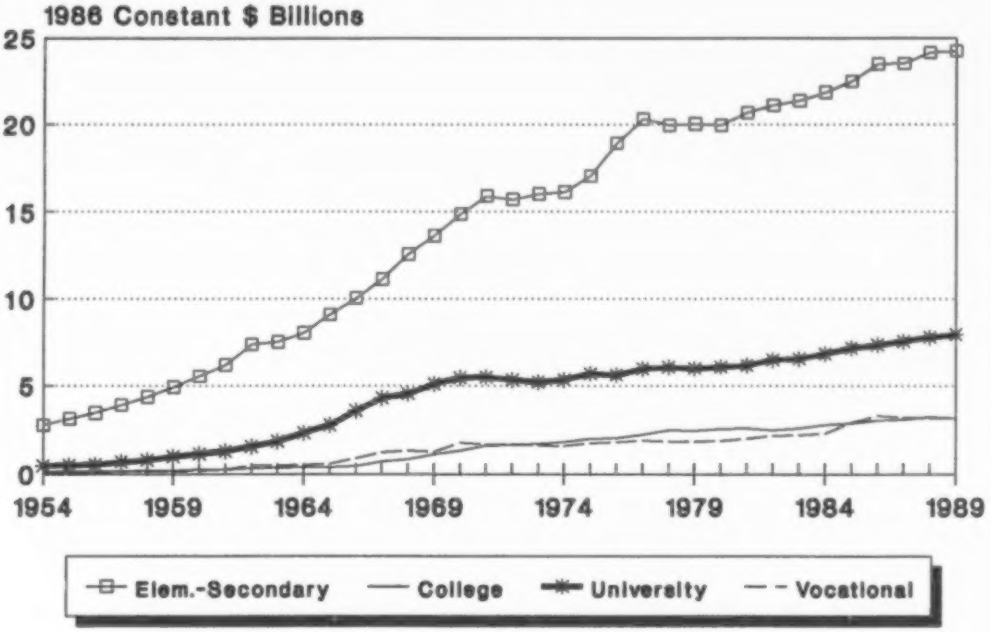
The change in provincial-local government spending priorities does not reflect the relative costs of and demand for the various goods and services supported by government. In fact, education costs increased more than the overall growth in the Consumer Price Index (CPI) and much faster than many other components in the index. Furthermore, demand for education services, particularly higher education, increased over the period. In fact, many universities have not been able to accommodate all qualified applicants. As a result, entrance standards have generally risen and enrolment restrictions have been placed on numerous programs.

Expenditures on Education
by Level

	Current $ ('000)				**Constant $ 1986 ('000)**				
	ELEMENTARY/ SECONDARY	POSTSECONDARY NON-UNIVERSITY	UNIVERSITY	VOCATIONAL AND OCCUPATIONAL TRAINING	ELEMENTARY SECONDARY	POSTSECONDARY NON-UNIVERSITY	UNIVERSITY	VOCATIONAL/ OCCUPATIONAL TRAINING	GDP IMPLICIT PRICE INDEX
1954	591,433	25,850	96,195	19,208	2,750,851	120,233	447,419	89,340	21.5
1955	674,446	30,997	104,443	19,244	3,108,046	142,843	481,304	88,682	21.7
1956	776,117	32,186	116,109	23,378	3,449,409	143,049	516,040	103,902	22.5
1957	896,367	38,566	151,851	30,568	3,897,248	167,678	660,222	132,904	23.0
1958	1,015,558	42,997	182,428	31,385	4,358,618	184,536	782,953	134,700	23.3
1959	1,162,397	46,716	229,077	36,594	4,904,629	197,114	966,570	154,405	23.7
1960	1,328,294	57,600	272,940	47,152	5,534,558	240,000	1,137,250	196,467	24.0
1961	1,499,459	58,428	310,629	62,155	6,196,112	241,438	1,283,591	256,839	24.2
1962	1,808,782	73,633	378,693	116,829	7,382,784	300,543	1,545,686	476,853	24.5
1963	1,879,077	82,108	461,397	118,225	7,516,308	328,432	1,845,588	472,900	25.0
1964	2,066,156	93,112	597,326	133,353	8,039,518	362,304	2,324,226	518,883	25.7
1965	2,410,798	98,763	736,583	153,361	9,097,351	372,691	2,779,558	578,721	26.5
1966	2,790,479	124,965	991,647	247,691	10,037,694	449,514	3,567,076	890,975	27.8
1967	3,229,499	200,077	1,243,411	351,931	11,136,203	689,921	4,287,624	1,213,555	29.0
1968	3,774,308	251,203	1,359,972	390,840	12,581,027	837,343	4,533,240	1,302,800	30.0
1969	4,280,444	346,573	1,603,781	392,270	13,631,987	1,103,736	5,107,583	1,249,268	31.4
1970	4,879,046	429,995	1,790,812	574,816	14,875,140	1,310,960	5,459,793	1,752,488	32.8
1971	5,387,527	539,445	1,864,517	565,909	15,892,410	1,591,283	5,500,050	1,669,348	33.9
1972	5,623,103	584,323	1,906,775	598,401	15,706,992	1,632,187	5,326,187	1,671,511	35.8
1973	6,248,401	669,050	2,026,452	627,771	16,021,541	1,715,513	5,196,031	1,609,669	39.0
1974	7,187,140	805,020	2,372,617	697,031	16,114,664	1,804,978	5,319,769	1,562,850	44.6
1975	8,342,849	972,358	2,786,899	845,901	17,026,222	1,984,404	5,687,549	1,726,329	49.0
1976	10,070,893	1,081,485	2,987,470	959,886	18,894,734	2,029,053	5,605,009	1,800,912	53.3
1977	11,493,963	1,260,079	3,381,594	1,078,855	20,307,355	2,226,288	5,974,548	1,906,104	56.6
1978	11,962,831	1,477,896	3,634,783	1,103,494	19,938,052	2,463,160	6,057,972	1,839,157	60.0
1979	13,217,935	1,615,909	3,951,429	1,201,296	20,027,174	2,448,347	5,987,014	1,820,145	66.0
1980	14,567,989	1,845,688	4,438,290	1,349,608	19,956,149	2,528,340	6,079,849	1,848,778	73.0
1981	16,703,178	2,088,078	4,980,660	1,601,230	20,646,697	2,581,061	6,156,564	1,979,271	80.9
1982	18,532,387	2,179,004	5,704,125	1,876,234	21,083,489	2,478,958	6,489,334	2,134,510	87.9
1983	19,707,933	2,383,752	6,042,593	2,024,896	21,352,040	2,582,613	6,546,688	2,193,820	92.3
1984	20,780,564	2,652,294	6,517,923	2,165,187	21,828,324	2,786,023	6,846,558	2,274,356	95.2
1985	21,946,596	2,783,921	7,000,606	2,832,948	22,463,251	2,849,459	7,165,410	2,899,640	97.7
1986	23,479,540	3,015,210	7,368,652	3,275,058	23,479,540	3,015,210	7,352,217	3,275,058	100.0
1987	24,611,764	3,228,760	7,883,502	3,337,445	23,506,938	3,083,820	7,555,959	3,187,627	104.7
1988	26,482,011	3,539,950	8,548,659	3,468,582	24,140,393	3,226,937	7,775,978	3,161,880	109.7
1989	27,830,026	3,640,708	9,025,189	3,602,677	24,221,084	3,168,588	7,929,995	3,135,489	114.9

Rate of Change During the Decade

Year	%	%	%	%	%	%	%	%	%
1960s	222.3	501.7	487.6	731.9	146.3	359.9	349.1	535.9	30.8
1970s	170.9	275.8	120.7	109.0	34.6	86.8	9.7	3.9	101.2
1980s	91.0	97.3	103.3	166.9	21.4	25.3	28.9	69.6	57.4



EXPENDITURES ON EDUCATION
BY LEVEL

Expenditures on education have varied by level and over time. The 1960s was a period of substantial expansion in the postsecondary education, and vocational and occupational training sectors. There was a fourfold increase in constant dollar expenditures on postsecondary education and a sixfold increase on vocational education. At the elementary-secondary level expenditures more than doubled during that decade, primarily because of the increase in the population aged 5-18.

In the 1970s the postsecondary non-university sector (primarily colleges) had the largest spending increase, a reflection of the continued expansion and maturing of that sector. And although elementary enrolment declined by about 20% during the 1970s and secondary enrolment fell almost 10% in the latter half of the decade, constant dollar expenditures on elementary-secondary education increased steadily throughout the decade. By contrast, full-time university enrolment increased 18%, almost double their constant dollar expenditure increase of 9.7%.

During the 1980s, elementary-secondary expenditures increased by over 20% despite enrolment declines during the first half of the decade. Expenditure growth in the postsecondary non-university sector also outpaced full-time enrolment growth. But for the second consecutive decade, growth in expenditures on universities (30.4%) trailed enrolment growth (34.4%).

Established Programs Financing
The Formula in 1977

Tax Transfer:

the sum of - the value of 13.5 Personal Income Tax (PIT) equalized points

plus - the value of 1.0 Corporate Income Tax (CIT) equalized point

plus - the Quebec Abatement. This is the special further reduction of 8.5 unequalized Personal Income Tax (PIT) points in that province for various opting-out arrangements. The cash transfer to Quebec is reduced by the amount of this abatement.

Cash Transfer

The sum of Basic Cash plus Transitional Adjustment Payments plus Levelling Payments

BASIC CASH

the sum of - 50% of the per capita federal contributions for all established programs in 1975-76 (under the cost-sharing arrangements)

plus - $7.63 - the so-called Revenue Guarantee - compensation for termination of tax sharing agreements

times - the EPF escalator which is the rate of growth in the economy as defined by the growth in per capita GNP

times - provincial population

TRANSITIONAL ADJUSTMENT PAYMENTS

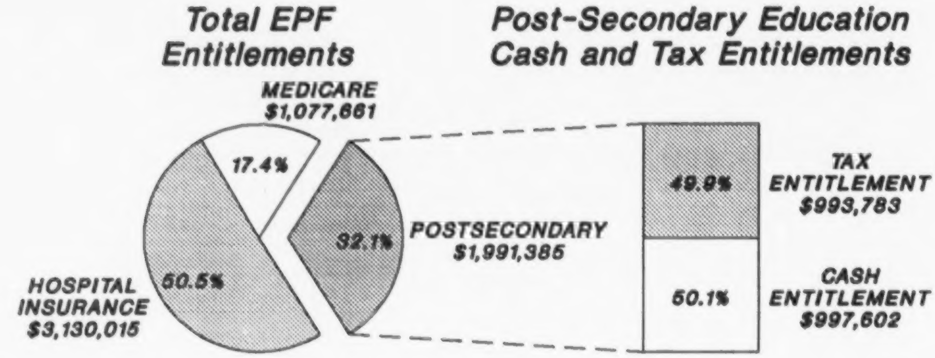
Basic Cash minus the value of the Tax Transfer

(e.g., if the value of the tax was less than the Basic Cash contribution then additional cash was added to the Cash Transfer; however, if the value of the tax points was greater than the Basic Cash, no adjustment was made)

LEVELLING PAYMENTS

The EPF formula yields marginally different per capita total transfers for each province. The levelling adjustments were designed to bring provinces to an equal per capita total transfer by the end of the fifth year of the program.

ESTABLISHED PROGRAMS FINANCING (EPF) BY PROGRAM, 1977-78
CURRENT $ ('000)



Excludes compensation for termination of the Revenue Guarantee Program

Established Programs Financing (EPF) arrangements were introduced in 1977 as an unconditional block-funding mechanism to provide federal support to provincial governments for their health and postsecondary education (PSE) programs. While EPF replaced the previous cost-sharing arrangements, it used the federal funding provided under those arrangements in 1975-76 as the base year for the new program. For administrative purposes, the federal government allocated the EPF cash transfer according to the shares that each of the "established" programs had been receiving in 1975-76: 32.1% to PSE and 67.9% to health programs. Although certain conditions/principles for federal support for medicare and hospital care exist under the Canada Health Act, the EPF legislation stipulated no such conditions/principles for postsecondary education. In fact, PSE was not even defined in this legislation.

Under the agreement with the provinces, federal EPF contributions in 1977 were a mix of tax and cash transfers, with each portion calculated separately. The tax transfer was computed as the value of 13.5 equalized personal income tax (PIT) points and 1.0 corporate tax point. Although the tax points are equalized under the Equalization Program, the value of these tax points still varies by province. Quebec receives a further tax abatement of 8.5 unequalized PIT points in respect of previously negotiated opting-out arrangements; the province's cash transfer, however, is reduced by this amount.

The basic cash contribution in 1977-78 was computed according to the following formula:

Basic Cash = [half the per capita base year contributions plus revenue guarantee] times the EPF escalator (i.e., per capita growth in the economy) times population in the province.

In addition to the basic cash transfer, a transitional adjustment payment was made to provinces where the value of the tax points was less than the basic cash. Finally, levelling adjustments were made so that the total per capita transfer to each province would eventually be equal.

Established Programs Financing

Amendments to EPF Formula 1982 to 1991

Bill C-97 (1982)

Termination of revenue guarantee compensation.

Changed methodology for computing the total and cash EPF entitlements.

TOTAL EPF ENTITLEMENT

the sum of - total of per capita federal contributions for all established programs in 1975-76 (under cost-sharing arrangements)
times - EPF escalator which is rate of growth in economy as defined by growth in per capita GNP
times - provincial population

Cash = Total entitlement minus tax transfer

Bill C-12 (1983)

Formally split tax transfer between health (67.9%) and PSE (32.1%)

Restricted EPF escalator for PSE portion of EPF to 6% for 1983-84 and 5% for 1984-85.

Required Department of the Secretary of State to produce an annual report to Parliament on nature and purposes of federal contributions to PSE.

Bill C-96 (1986)

Reduced rate of growth in EPF escalator by two points.

Bill C-33 (1989)

Reduced rate of growth in EPF escalator by an additional point.

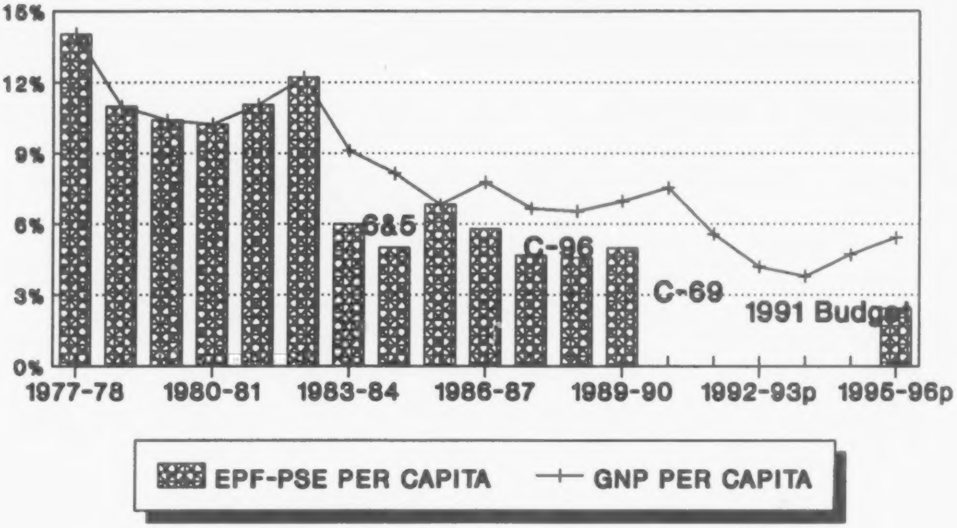
Bill C-69 (1990)

Imposed a two-year per capita freeze on total EPF transfers beginning in 1990-91, with a return to amendments that were never passed under Bill C-33.

Budget February 1991 - Bill C-20 (proposed)

Extended per capita freeze for an additional three years ending in 1994-95.

PER CAPITA GROWTH RATE • GNP AND TOTAL EPF-PSE ENTITLEMENTS ACTUAL AND PROJECTED



• **Average per capita growth over 3 years**

In 1982, the federal government made two major changes to EPF. The first was the elimination of the revenue guarantee. Some provinces had argued that this compensation was in respect of changes in the tax base in 1972 and should not have been included under EPF. The federal government responded by eliminating this compensation and removing it from the historical EPF calculations.

Under the second amendment, the cash portion became the difference between the total and the tax transfer. While this had only limited direct financial implications, in retrospect it has had the most serious consequences on EPF, as it opened the door for all the subsequent restraint measures. The immediate impact was elimination of the "fiscal dividend" -- the amount by which the tax transfer exceeded the basic cash transfer. As a result, any restriction on the total transfer was effectively placed completely on the cash transfers. Even in 1982 it was recognized that the EPF cash entitlements would eventually disappear because of these amendments, but that date was well into the next century. In the mid-term, cash entitlements would continue to grow.

In 1983, under Bill C-12, the tax transfer was formally split among the established programs according to their respective shares in 1975-76 -- 67.9% for health and 32.1% for PSE. This amendment was necessitated by the desire of the federal government to restrain only the PSE portion of EPF under its broader "6&5" anti-inflation program.

All the amendments since 1983 have had an impact on the "EPF escalator," either holding it below the rate of growth in the economy or freezing it altogether. These actions were characterized as temporary restraint measures and it was stressed that EPF transfers would grow at the same rate as the population. However, the federal investment in postsecondary education was permanently fixed to grow by less than the rate of growth in the economy. Finally, in the 1991 budget the federal government conceded, if only implicitly, that their restraint measures were actually reducing EPF cash contributions.

Established Programs Financing
Entitlements for Post-Secondary Education

Current $ ('000,000)

TOTAL ENTITLEMENT						**TAX TRANSFER**
	No cuts	If 6&5 only	After C-96	After C-96 & C-69	After C-96 & C-69 & B-91	
1977-78a	1,991	1,991	1,991	1,991	1,991	994
1978-79a	2,283	2,283	2,283	2,283	2,283	1,125
1979-80a	2,609	2,609	2,609	2,609	2,609	1,287
1980-81a	2,940	2,940	2,940	2,940	2,940	1,503
1981-82a	3,310	3,310	3,310	3,310	3,310	1,706
1982-83a	3,704	3,704	3,704	3,704	3,704	1,911
1983-84a	4,075	3,959	3,959	3,959	3,959	1,953
1984-85a	4,442	4,189	4,189	4,189	4,189	2,129
1985-86a	4,781	4,508	4,508	4,508	4,508	2,328
1986-87a	5,192	4,896	4,805	4,805	4,805	2,566
1987-88a	5,595	5,276	5,081	5,081	5,081	2,883
1988-89b	6,030	5,686	5,373	5,373	5,373	3,163
1989-90c	6,530	6,157	5,709	5,709	5,709	3,526
1990-91d	7,119	6,713	6,109	5,788	5,788	3,773
1991-92e	7,605	7,171	6,403	5,856	5,856	3,983
1992-93p	8,022	7,565	6,624	6,000	5,929	4,292
1993-94p	8,435	7,954	6,831	6,126	6,006	4,638
1994-95p	8,943	8,433	7,104	6,309	6,082	5,005

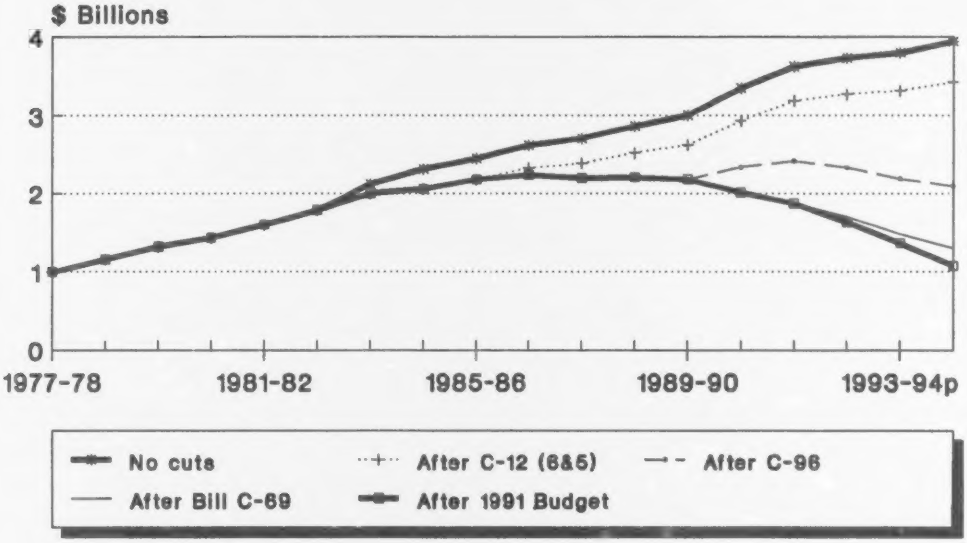
Residual Cash

	No cuts	6&5	Bill C-96	Bill C-69	Budget 91
1977-78a	998	0	0	0	0
1978-79a	1,158	0	0	0	0
1979-80a	1,322	0	0	0	0
1980-81a	1,437	0	0	0	0
1981-82a	1,604	0	0	0	0
1982-83a	1,792	0	0	0	0
1983-84a	2,122	117	0	0	0
1984-85a	2,313	253	0	0	0
1985-86a	2,454	273	0	0	0
1986-87a	2,626	296	91	0	0
1987-88a	2,713	319	195	0	0
1988-89b	2,868	344	313	0	0
1989-90c	3,003	373	448	0	0
1990-91d	3,346	406	604	321	0
1991-92e	3,622	434	769	546	0
1992-93p	3,730	458	940	625	71
1993-94p	3,797	481	1,123	705	120
1994-95p	3,938	510	1,329	795	227

Source: Department of Finance, Established Programs Financing calculations

a	Final Calculations
b	Second Interim Adjustment (28/2/91)
c	First Interim Adjustment (28/2/91)
d	Second Adjustment to Advance (11/12/90)
e	Advance Calculation(04/4/91)
p	Projections

EFFECTS OF EPF ESCALATOR CUTS ON PSE CASH ENTITLEMENTS ACTUAL AND PROJECTED



This analysis focuses only on the impact of changes to EPF since 1986. While previous changes were significant both quantitatively and because they set a precedent for future restraint measures, more recent changes have not only accelerated the erosion of EPF cash entitlements, but brought about its imminent demise.

If no further changes had been made to EPF, total PSE cash entitlements would have risen from a little over $2.1 billion in 1985-86 to over $3.5 billion in 1994-95. Unlike the "6&5" measures which temporarily restrained the EPF-PSE escalator, Bill C-96 permanently reduced the EPF escalator for both health and PSE to 2 percentage points below growth in the economy. However, even under this restraint measure, total EPF cash would not have begun to decline until 1992-93 and projected federal government investments in PSE through EPF would have been about $2.2 billion in 1994-95.

The next proposed amendment to EPF, Bill C-33, would have reduced the escalator by another percentage point -- the rate of growth in per capita GNP minus three percentage points. However, before this bill was passed it was superseded by Bill-C-69 which imposed a two-year freeze on total EPF entitlements followed by the changes set out under Bill C-33. The effect of this "freeze" was a pronounced decline in cash transfers to the provinces. In fact, the Department of Finance estimated that as a result of Bill C-69, between 1989-90 and 1994-95, PSE cash entitlements would decline by about $700 million.

Finally, in the 1991 federal budget the federal government announced its intention to extend the freeze for three years, ending in 1994-95. The Department of Finance projects that by 1994-95 aggregate PSE cash entitlements will fall below 1977-78 levels, and the cash entitlement in Quebec would in fact be negative. Halting or reversing this withdrawal will require, at a minimum, new arrangements to reform or, more likely, replace EPF.

Total Expenditures on University Education
by Type of Expenditure

Current $ '000

	OPERATING	SPONSORED RESEARCH	CAPITAL	STUDENT AID	OTHER	TOTAL
1960	161,553	21,015	79,800	9,659	913	272,940
1961	184,792	26,538	85,008	13,211	1,080	310,629
1962	213,277	30,738	112,487	21,044	1,147	378,693
1963	253,135	36,796	146,100	24,040	1,326	461,397
1964	297,609	47,613	217,746	32,789	1,569	597,326
1965	371,179	61,553	251,812	49,618	2,421	736,583
1966	499,656	82,639	324,466	73,618	11,268	991,647
1967	641,455	107,413	378,101	100,277	16,165	1,243,411
1968	769,455	127,398	335,936	108,572	18,611	1,359,972
1969	941,123	143,074	356,305	140,173	23,106	1,603,781
1970	1,072,053	151,894	392,243	159,815	14,807	1,790,812
1971	1,197,699	168,028	315,194	163,139	20,457	1,864,517
1972	1,255,829	178,277	239,319	161,652	71,698	1,906,775
1973	1,386,836	190,671	160,524	184,202	104,219	2,026,452
1974	1,621,685	215,631	188,972	197,558	148,771	2,372,617
1975	1,921,137	246,661	236,312	230,877	151,912	2,786,899
1976	2,168,376	280,167	155,515	233,396	150,016	2,987,470
1977	2,417,454	328,949	206,947	254,931	173,313	3,381,594
1978	2,599,188	376,942	233,190	271,288	154,175	3,634,783
1979	2,821,189	418,971	251,651	277,877	181,741	3,951,429
1980	3,195,688	469,220	293,142	315,060	165,180	4,438,290
1981	3,602,781	569,131	304,557	350,605	153,586	4,980,660
1982	4,072,922	665,079	392,014	394,388	179,722	5,704,125
1983	4,335,424	737,690	401,880	433,612	133,987	6,042,593
1984	4,549,111	830,209	369,201	526,911	242,491	6,517,923
1985	4,835,335	884,301	439,864	559,738	281,368	7,000,606
1986	5,141,045	910,322	551,127	604,995	161,163	7,368,652
1987	5,468,917	1,023,074	459,157	707,010	225,344	7,883,502
1988	5,893,338	1,147,351	518,814	789,837	199,319	8,548,659
1989	6,287,692	1,255,853	465,557	827,004	189,083	9,025,189

Rate of change (Current $)

Year	%	%	%	%	%	%
1960s	482.5	580.8	346.5	1351.2	2430.8	487.6
1970s	163.2	175.8	-35.8	73.9	1127.4	120.7
1980s	96.8	167.6	58.8	162.5	14.5	103.3

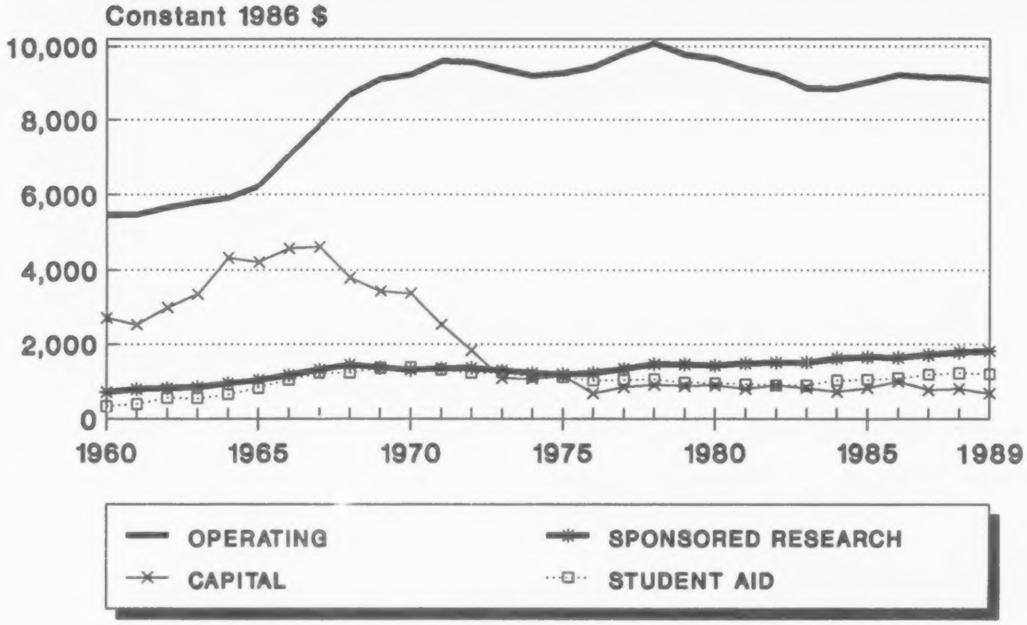
Rate of change (Constant 1986 $)

Year	%	%	%	%	%	%
1960s	345.3	420.4	241.3	1009.2	1834.4	349.1
1970s	30.8	37.1	-68.1	-13.6	510.0	9.7
1980s	24.7	69.6	0.6	66.3	-27.5	28.9

Rate of change per FTE student (Constant 1986 $)

Year	%	%	%	%	%	%
1960s	66.4	94.5	27.6	314.7	623.1	67.9
1970s	6.0	11.1	-74.2	-30.0	394.4	-11.1
1980s	-6.2	27.6	-24.3	25.2	-45.4	-3.0

EXPENDITURES ON UNIVERSITY EDUCATION PER FTE STUDENT, BY TYPE OF EXPENDITURE



Real expenditures on university education per full-time equivalent (FTE) student rose by some 55% during the 1960s, despite the rapid expansion of the university system. As well, per student expenditures in all categories increased in real terms. The most dramatic growth was in student aid and other, primarily administrative, expenditures.

During the first half of the 1970s, major capital expenditures declined rapidly, even in current dollar terms. Without this sharp decline in capital expenditures, other expenditures on universities would have grown during the 1970s. In fact, real operating expenditures per student rose by about 6% over the decade, and sponsored research increased by 11%. There was, however, a real decline in student aid in this decade.

Universities faced severe financial constraints during the 1980s. Operating funds per student were 6% lower in 1989 than they had been in 1980. Capital funding continued to decline despite the deterioration of many university buildings. The huge growth in capital expenditures during the 1960s should have produced sharp increases in either capital or maintenance expenditures 25 years later, but neither has grown in real terms. While funding for sponsored research increased in the 1980s, this kind of funding generally does not cover overhead or indirect costs of the research. Universities had to pay for overhead costs out of other sources, which as noted earlier were declining, causing additional financial stress in these areas. Finally, increases in student aid were offset by real increases in tuition fees and living accommodations.

General Operating Expenditures
by Function

Current $ ('000)

	INSTRUCTION	LIBRARY	ADMINISTRATION/ COMPUTING	PHYSICAL PLANT	STUDENT SERVICES	TOTAL
1960	101,162	10,977	14,124	20,483	-	146,746
1961	114,632	12,582	15,377	25,727	-	168,318
1962	135,301	14,906	17,006	28,447	-	195,660
1963	160,014	17,471	23,006	32,576	-	233,067
1964	189,940	19,615	27,483	35,709	-	272,747
1965	235,424	26,627	33,321	44,064	-	339,436
1966	314,345	38,379	43,762	59,259	-	455,745
1967	406,034	50,768	53,101	74,712	-	584,615
1968	487,432	62,876	60,481	88,807	-	699,596
1969	599,118	73,379	72,208	109,137	-	853,842
1970	686,227	83,336	81,723	126,105	-	977,391
1971	737,344	88,036	173,489	150,156	-	1,149,025
1972	785,179	91,575	149,221	166,591	39,569	1,232,135
1973	860,381	98,655	163,175	189,886	43,654	1,355,751
1974	1,013,479	111,498	187,200	217,468	50,857	1,580,502
1975	1,208,602	130,528	215,389	261,336	56,412	1,872,267
1976	1,361,469	147,626	246,817	301,856	55,511	2,113,279
1977	1,521,544	161,900	276,058	334,381	60,546	2,354,429
1978	1,649,321	173,134	297,249	351,388	64,493	2,535,585
1979	1,801,674	187,042	314,299	372,807	70,501	2,746,323
1980	2,017,273	209,740	359,701	408,470	79,847	3,075,031
1981	2,271,389	229,101	405,519	459,725	96,122	3,461,856
1982	2,535,899	258,145	486,719	508,828	109,496	3,899,087
1983	2,703,542	275,671	516,726	543,231	123,325	4,162,495
1984	2,842,809	288,383	525,860	565,859	125,212	4,348,123
1985	3,020,685	303,238	540,965	597,855	130,332	4,593,075
1986	3,241,743	321,971	578,040	607,261	140,875	4,889,890
1987	3,433,351	334,943	633,694	638,803	154,303	5,195,094
1988	3,693,571	352,219	697,450	672,767	166,556	5,582,563
1989	4,010,272	382,704	765,011	710,372	184,631	6,052,990

Rate of change (Current $)

Year	%	%	%	%	%	%
1960s	492.2	568.5	411.2	432.8	..	481.9
1970s	162.5	124.4	284.6	195.6	..	181.0
1980s	98.8	82.5	112.7	73.9	131.2	96.8

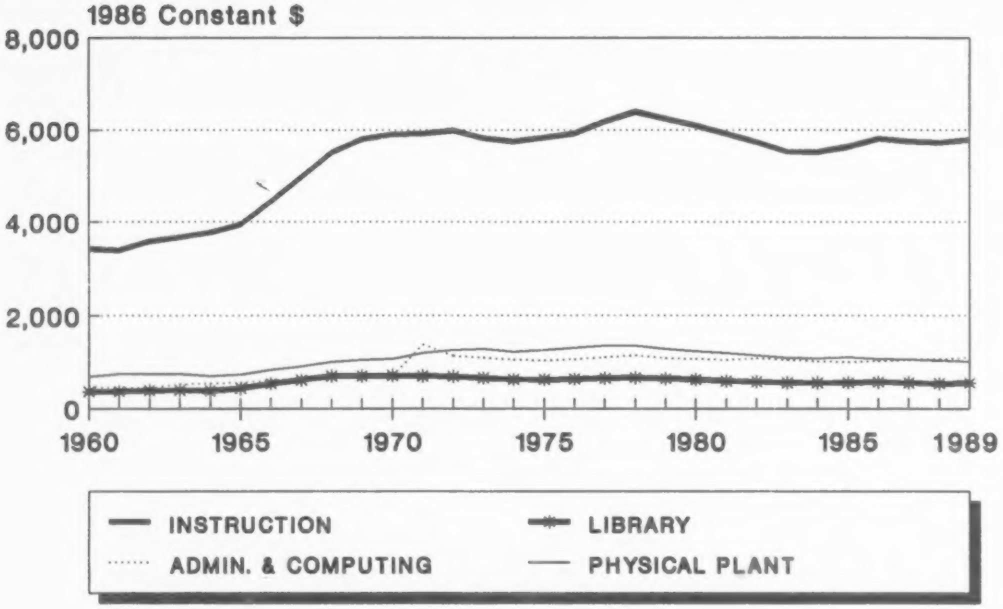
Rate of change (Constant 1986 $)

Year	%	%	%	%	%	%
1960s	352.7	410.9	290.8	307.2	..	344.7
1970s	30.5	11.5	91.1	46.9	..	39.6
1980s	26.0	15.6	34.8	10.2	46.5	24.7

Rate of change per FTE student (Constant 1986 $)

Year	%	%	%	%	%	%
1960s	69.2	91.0	46.1	52.2	..	66.2
1970s	5.7	-9.6	54.9	19.1	..	13.2
1980s	-5.2	-13.0	1.4	-17.1	10.3	-6.1

GENERAL OPERATING EXPENDITURES PER FTE STUDENT, BY FUNCTION



Not only was there a substantial expansion of the Canadian university system during the 1960s but the real level of investment in each student also rose dramatically. Constant dollar expenditures per full-time equivalent student increased by almost 70%, and expenditures on university libraries virtually doubled.

During the 1970s, overall general operating expenditures grew at a much more modest pace -- 13.2%. In fact, universities spent almost 10% less in real, per student terms on their libraries at the end of the decade than they had in 1970. Per student instruction expenditures continued to rise over the decade, but by only 5.7%. However, if a salary price index had been used to measure change, instead of the GDP implicit price index, there would have been a marginal decline in instructional expenditures per student.

The 1980s were a very difficult period for Canadian universities. High inflation and unexpectedly high enrolment growth at the beginning of the decade more than offset increases in instructional expenditures. As a result, real instructional expenditures per student fell almost 10% between 1980 and 1983. While some of this decline was recouped between 1983 and 1986, universities still spent about 5% less per student on instruction in 1989 than they had at the beginning of the decade. Even so, instruction fared much better during the 1980s than did either libraries or maintenance.

The decline in library acquisitions per student, which began in the late 1960s, continued, falling another 13% in the 1980s. There was also a sharp drop in physical plant (maintenance) expenditures per FTE student, although maintenance expenditures should have increased because many of the facilities, particularly the mechanical and electrical equipment, were reaching the end of their normal lifespan. In fact, the Canadian Association of University Business Officers (CAUBO) estimates that in 1989 alone, $750 million worth of maintenance costs were deferred.

Total University Income
by Source of Funds

Current $ ('000)

	GOVERNMENT	FEES	GIFTS, DONATIONS AND NON-GOVERNMENT GRANTS	OTHER	TOTAL
1977	2,387,893	327,581	124,480	376,590	3,216,544
1978	2,605,489	340,061	159,935	429,255	3,534,740
1979	2,805,921	357,739	166,060	494,735	3,824,455
1980	3,133,938	400,519	195,431	581,557	4,311,445
1981	3,556,398	469,095	226,584	649,013	4,901,090
1982	4,052,572	567,555	306,083	660,673	5,586,883
1983	4,360,259	632,476	298,863	693,056	5,984,654
1984	4,468,217	694,331	350,553	766,439	6,279,540
1985	4,711,701	734,927	382,571	803,873	6,633,072
1986	5,143,648	771,318	399,636	909,609	7,224,211
1987	5,409,008	831,694	475,258	944,499	7,660,459
1988	5,920,416	916,261	532,361	1,083,695	8,452,733
1989	6,285,841	1,016,108	582,981	1,207,504	9,092,434

Percentage Distribution

	%	%	%	%	%
1977	74.2	10.2	3.9	11.7	100.0
1978	73.7	9.6	4.5	12.1	100.0
1979	73.4	9.4	4.3	12.9	100.0
1980	72.7	9.3	4.5	13.5	100.0
1981	72.6	9.6	4.6	13.2	100.0
1982	72.5	10.2	5.5	11.8	100.0
1983	72.9	10.6	5.0	11.6	100.0
1984	71.2	11.1	5.6	12.2	100.0
1985	71.0	11.1	5.8	12.1	100.0
1986	71.2	10.7	5.5	12.6	100.0
1987	70.6	10.9	6.2	12.3	100.0
1988	70.0	10.8	6.3	12.8	100.0
1989	69.1	11.2	6.4	13.3	100.0

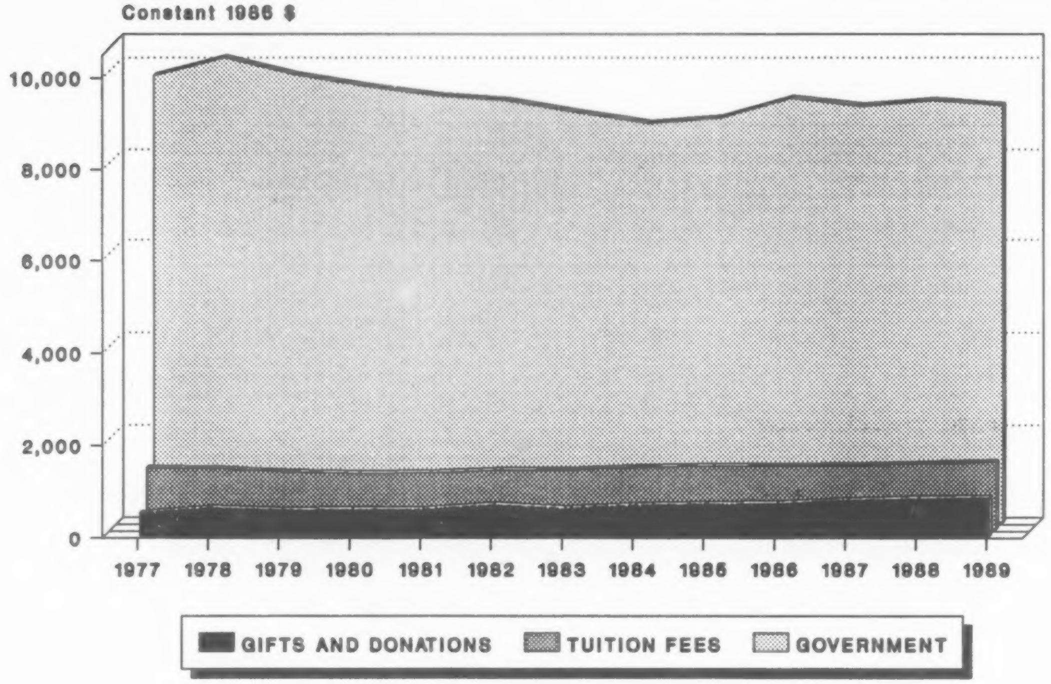
Constant 1986 $ Per FTE Student

1977	9,707	1,332	506	1,531	13,075
1978	10,109	1,319	621	1,665	13,714
1979	9,728	1,240	576	1,715	13,259
1980	9,484	1,212	591	1,760	13,048
1981	9,277	1,224	591	1,693	12,784
1982	9,175	1,285	693	1,496	12,649
1983	8,911	1,293	611	1,416	12,231
1984	8,682	1,349	681	1,489	12,202
1985	8,789	1,371	714	1,500	12,373
1986	9,225	1,383	717	1,631	12,956
1987	9,052	1,392	795	1,581	12,819
1988	9,179	1,421	825	1,680	13,105
1989	9,072	1,467	841	1,743	13,123

Rate of Change per FTE Student (Constant 1986 $)

	%	%	%	%	%
1980/1977	-2.3	-9.0	16.9	15.0	-0.2
1984/1980	-8.5	11.3	15.2	-15.4	-6.5
1986/1984	6.2	2.5	5.2	9.5	6.2
1989/1986	-1.7	6.0	17.4	6.8	1.3
1989/1980	-4.3	21.0	42.3	-1.0	0.6
1989/1977	-6.5	10.1	66.3	13.8	0.4

TOTAL UNIVERSITY INCOME PER FTE STUDENT, BY SOURCES OF FUNDS



Universities derive income from four main sources: the public sector (government); tuition fees; private sector gifts and donations; and internally, through some small investments and through the operation of ancillary enterprises such as bookstores and student residences. These internal sources will not be examined in detail, as they have offsetting expenses, and their purposes are outside the normal teaching and research goals of universities.

Except for the middle part of the 1980s, income from government sources declined steadily between 1977 and 1989. In 1978, governments invested just over $10,000 (constant 1986 $) per full-time equivalent (FTE) student. By 1984, that figure had fallen to about $8,700. Over the latter part of the decade, annual public sector support totalled about $9,000 per student. While the most appropriate level of public sector support for universities is difficult to determine, it is clear that government support has not kept pace with inflation and student growth.

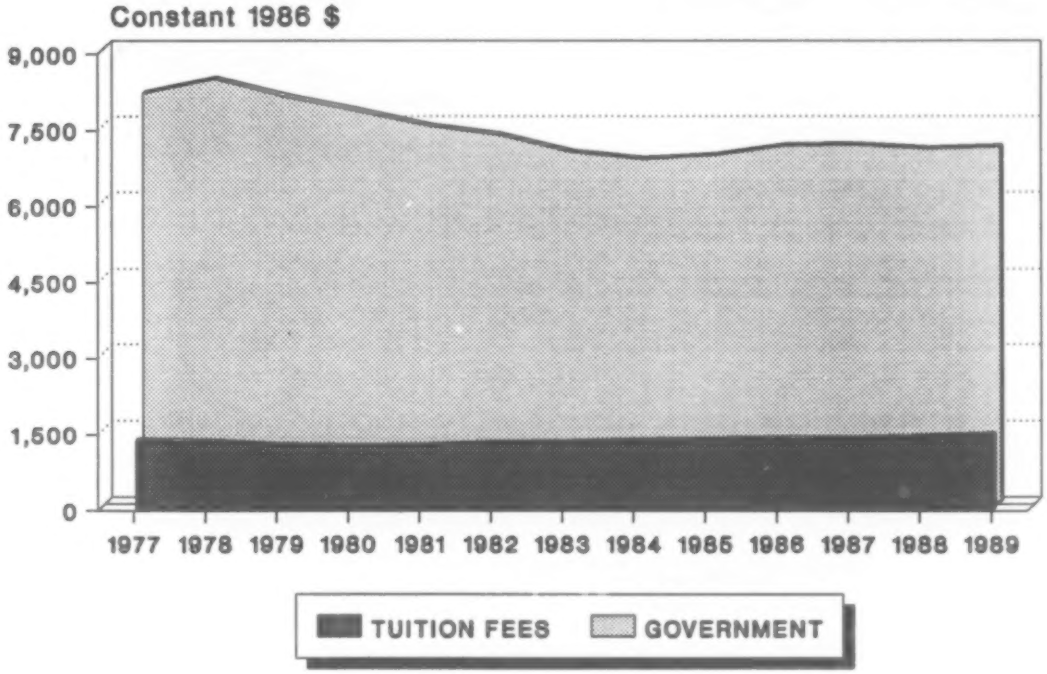
After a decline in the late 1970s, real tuition fee income per FTE student increased 20% over the 1980s. In fact, without the freeze on tuition fees in Quebec (at 1967 levels in current dollars), the increase would have been somewhat higher.

Similarly, gifts and donations from the private sector grew from $100 million in 1977 to almost $600 million in 1989. Although they still represent a relatively small proportion of total income their significance should be recognized. With this decline in public sector support, universities have had to rely more on tuition fees and private sector funding.

General Operating Income
by Source of Funds

	GOVERNMENT	FEES	GIFTS, DONATIONS, NON-GOVERNMENT GRANTS	OTHER	TOTAL
Current $ ('000)					
1977	1,977,836	327,581	12,326	53,212	2,370,955
1978	2,147,300	340,061	15,814	59,083	2,562,258
1979	2,302,371	357,739	20,193	77,423	2,757,726
1980	2,545,846	400,519	22,679	89,127	3,058,171
1981	2,842,363	469,095	20,646	114,864	3,446,968
1982	3,193,999	567,555	27,836	120,484	3,909,874
1983	3,371,212	632,476	25,833	106,120	4,135,641
1984	3,472,232	689,040	29,668	108,427	4,299,367
1985	3,658,309	730,033	30,650	98,771	4,517,763
1986	3,916,774	767,519	34,140	98,012	4,816,445
1987	4,201,182	826,970	32,017	104,313	5,164,482
1988	4,488,011	911,681	31,269	116,351	5,547,312
1989	4,847,202	1,010,969	33,497	161,850	6,053,518
Percentage distribution					
1977	83.4	13.8	0.5	2.2	100.0
1978	83.8	13.3	0.6	2.3	100.0
1979	83.5	13.0	0.7	2.8	100.0
1980	83.2	13.1	0.7	2.9	100.0
1981	82.5	13.6	0.6	3.3	100.0
1982	81.7	14.5	0.7	3.1	100.0
1983	81.5	15.3	0.6	2.6	100.0
1984	80.8	16.0	0.7	2.5	100.0
1985	81.0	16.2	0.7	2.2	100.0
1986	81.3	15.9	0.7	2.0	100.0
1987	81.3	16.0	0.6	2.0	100.0
1988	80.9	16.4	0.6	2.1	100.0
1989	80.1	16.7	0.6	2.7	100.0
Per FTE (Constant dollars)					
1977	8,040	1,332	50	216	9,638
1978	8,331	1,319	61	229	9,941
1979	7,982	1,240	70	268	9,560
1980	7,704	1,212	69	270	9,255
1981	7,414	1,224	54	300	8,991
1982	7,231	1,285	63	273	8,852
1983	6,890	1,293	53	217	8,452
1984	6,747	1,339	58	211	8,354
1985	6,824	1,362	57	184	8,427
1986	7,024	1,376	61	176	8,638
1987	7,031	1,384	54	175	8,643
1988	6,958	1,413	48	180	8,600
1989	6,996	1,459	48	234	8,737
Rate of Change per FTE Student (Constant 1986 $)					
	%	%	%	%	%
1980/1977	-4.2	-9.0	37.0	24.7	-4.0
1984/1980	-12.4	10.5	-16.0	-21.9	-9.7
1986/1984	4.1	2.8	6.2	-16.6	3.4
1989/1986	-0.4	6.0	-21.0	32.9	1.1
1989/1980	-9.2	20.4	-29.6	-13.4	-5.6
1989/1977	-13.0	9.6	-3.5	8.0	-9.3

GENERAL OPERATING INCOME PER FTE STUDENT, BY SOURCE OF FUNDS



Government and students are the two primary sources of funding for the general operating fund of Canadian universities. While government funding declined in real terms over the 1977-1989 period, it still accounted for just over 80% of all general operating income in 1989.

In constant dollars, governments supplied just over $8,000 per full-time equivalent (FTE) student in the late 1970s. By 1984, this support had fallen below $6,800. A slight rise brought the 1986 figure to about $7,000, a level at which it remained until the end of the decade.

Real income from tuition fees per FTE declined in the latter part of the 1970s. However, that trend was reversed in the 1980s. By the end of the decade, tuition fees were 20% higher than they had been in 1980. Yet, despite this increase, 1989 tuition fees accounted for only about 17% of general operating income.

There were sharp declines in the real level of per student income from other sources during the 1980s. But, as noted earlier, these sources constitute a very small proportion, about 3%, of total general operating income, since gifts and donations from alumni and the private sector are normally accounted for in the special purpose and trust fund.

Sponsored Research Income
by Source of Funds

Current $ ('000)

	FEDERAL	PROVINCIAL	GIFTS AND DONATIONS	OTHER	TOTAL
1977	198,245	60,869	62,332	13,745	335,191
1978	217,656	70,610	80,647	13,893	382,806
1979	242,826	75,759	89,433	24,413	432,431
1980	290,023	87,381	89,073	28,455	494,932
1981	357,564	108,581	118,724	28,282	613,151
1982	396,109	132,461	115,361	29,211	673,142
1983	461,590	144,282	137,299	31,848	775,019
1984	521,937	159,050	149,844	34,868	865,699
1985	519,194	167,680	171,452	26,881	885,207
1986	527,154	194,779	176,083	32,577	930,593
1987	569,308	208,642	227,113	37,623	1,042,686
1988	629,979	242,144	277,625	44,226	1,193,974
1989	674,443	262,644	294,139	45,695	1,276,921

Percentage Distribution

	%	%	%	%	%
1977	59.1	18.2	18.6	4.1	100.0
1978	56.9	18.4	21.1	3.6	100.0
1979	56.2	17.5	20.7	5.6	100.0
1980	58.6	17.7	18.0	5.7	100.0
1981	58.3	17.7	19.4	4.6	100.0
1982	58.8	19.7	17.1	4.3	100.0
1983	59.6	18.6	17.7	4.1	100.0
1984	60.3	18.4	17.3	4.0	100.0
1985	58.7	18.9	19.4	3.0	100.0
1986	56.6	20.9	18.9	3.5	100.0
1987	54.6	20.0	21.8	3.6	100.0
1988	52.8	20.3	23.3	3.7	100.0
1989	52.8	20.6	23.0	3.6	100.0

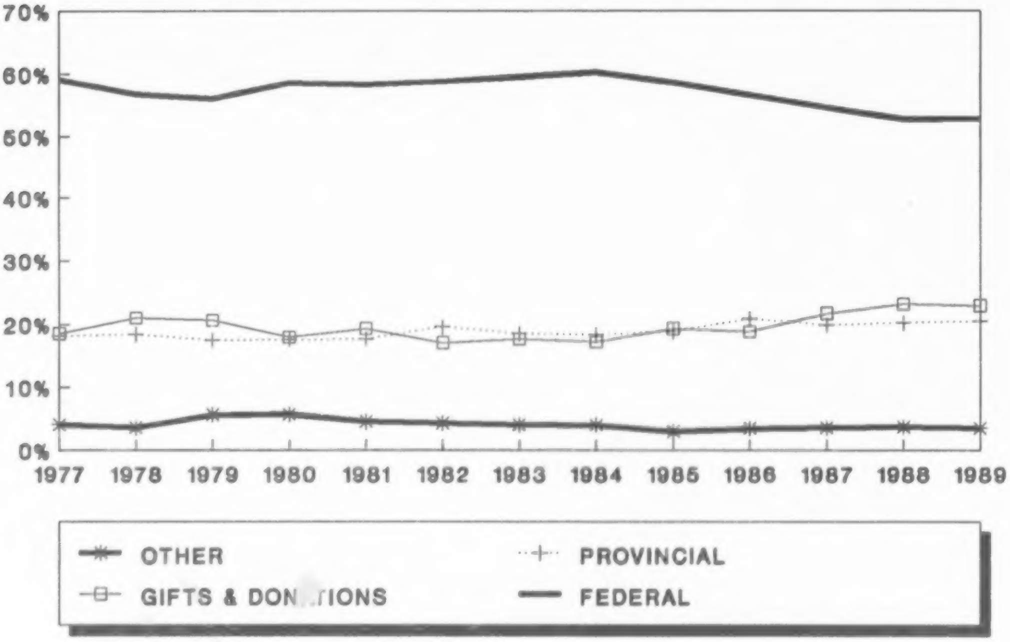
Constant 1986 $ Per FTE Student

1977	806	247	253	56	1,363
1978	844	274	313	54	1,485
1979	842	263	310	85	1,499
1980	878	264	270	86	1,498
1981	933	283	310	74	1,599
1982	897	300	261	66	1,524
1983	943	295	281	65	1,584
1984	1,014	309	291	68	1,682
1985	969	313	320	50	1,651
1986	945	349	316	58	1,669
1987	953	349	380	63	1,745
1988	977	375	430	69	1,851
1989	973	379	425	66	1,843

Rate of Change Per FTE Student (Constant 1986 $)

	%	%	%	%	%
1980/1977	8.9	6.9	6.4	54.1	9.9
1984/1980	15.6	16.9	8.0	-21.3	12.3
1986/1984	-6.8	13.0	8.5	-13.8	-0.8
1989/1986	3.0	8.5	34.4	12.9	10.4
1989/1980	10.9	43.3	57.5	-23.4	23.0
1989/1977	20.8	53.2	67.5	18.0	35.3

SPONSORED RESEARCH INCOME BY SOURCE OF FUNDS



Sponsored research income consists of funds destined for supporting research, mainly in the form of grants and contracts from sources external to the university sector, as well as funds transferred from the special purpose and trust fund. In current dollars, total sponsored research spending almost tripled between 1977 and 1989, rising from $335 million to $1.2 billion. In constant dollars, sponsored research income per FTE student was $1,800 in 1989, up 35% over 1977. However, rates of growth varied by funder and over time.

While the federal government remains the major funder of sponsored research, its contribution accounted for 53% of funding in 1989, down from a peak of 60% in 1984.

The most remarkable growth occurred in provincial funding and gifts and donations, where levels more than quadrupled. Indeed, income from provincial sources has accounted for more than 20% of total sponsored research funds since 1986. Gifts and donations, however, grew erratically to 23% in 1988. These sources had represented 21% of total sponsored research funds in 1978, but then fell to 17% during the first half of the eighties.

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GERD and GDP

Current $ ('000,000)

			ANNUAL RATE OF CHANGE	
	GERD	GPD	GERD %	GDP %
1979	2,935	276,132		
1980	3,448	309,680	17.5	12.1
1981	4,285	355,647	24.3	14.8
1982	5,035	373,898	17.5	5.1
1983	5,348	403,262	6.2	7.9
1984	6,015	443,654	12.5	10.0
1985	6,709	477,306	11.5	7.6
1986	7,220	504,124	7.6	5.6
1987	7,542	548,949	4.5	8.9
1988	8,058	603,571	6.8	10.0
1989	8,568	652,835	6.3	8.2
1990	9,097	677,900	6.2	3.8

Constant 1986 $ ('000,000)[1]

1979	4,447	418,382		
1980	4,723	424,219	6.2	1.4
1981	5,297	439,613	12.1	3.6
1982	5,728	425,367	8.1	-3.2
1983	5,794	436,904	1.2	2.7
1984	6,318	466,023	9.0	6.7
1985	6,867	488,542	8.7	4.8
1986	7,220	504,124	5.1	3.2
1987	7,197	523,806	-0.3	3.9
1988	7,332	549,200	1.9	4.8
1989	7,438	566,697	1.4	3.2
1990	7,657	570,623	3.0	0.7

Rate of Change

	CURRENT $		CONSTANT 1986 $	
	GERD %	GDP %	GERD %	GDP %
1979-1983	82.2	46.0	30.3	4.4
1983-1987	41.0	36.1	24.2	19.9
1987-1990	20.6	23.5	6.4	8.9

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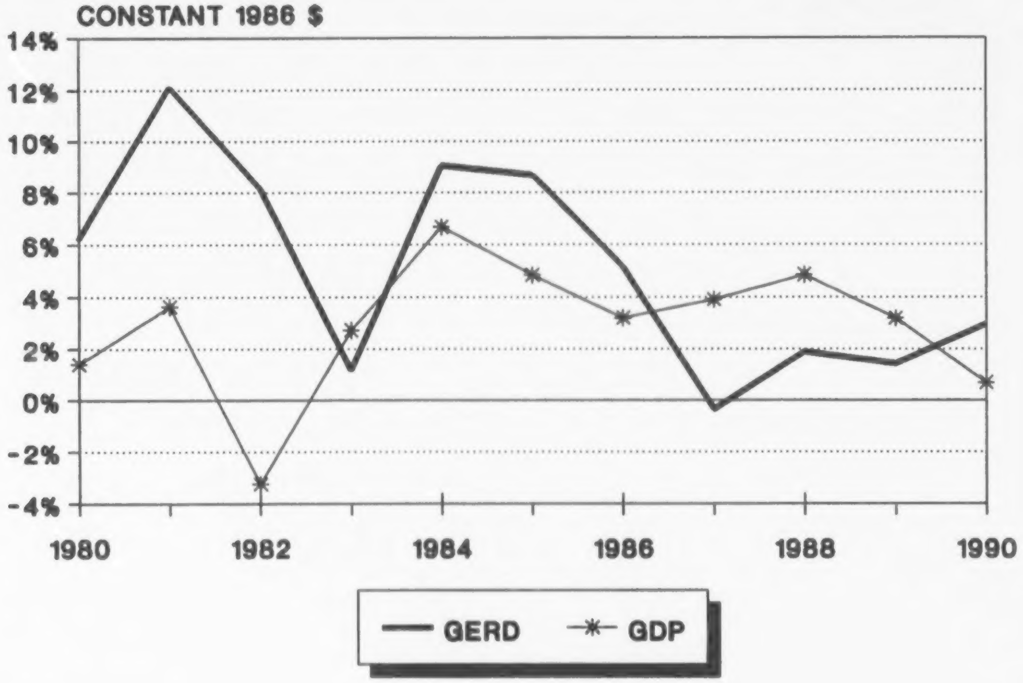
[1] Gerd and GDP data series have been adjusted using the GDP implicit price indexes (1986=100) taken from the Canadian Economic Observer, Table 1.16, Catalogue 11-010, Vol. 4, No.5 Monthly, May 1991.

GROWTH IN GERD AND GDP



Between 1979 and 1990, growth in gross domestic expenditures on research and development (GERD) outstripped growth in the Gross Domestic Product (GDP). In constant dollar terms, GERD grew twice as fast as GDP, 72% versus 36%. The pace of growth in GERD, however, did not persist throughout the period.

The early 1980s were a time of sustained growth, when GERD rose by 30% (constant dollars), and even exceeded 12% in a single year (1981).

These years of strong growth were followed by moderate growth from 1983 to 1987. During this period, as the spread between the two indicators narrowed, GERD rose by 24% and GDP by 20%.

Finally, the period from 1987 to 1990 was marked by stronger growth in GDP than in GERD, except for 1990, when the latter posted a larger rise. This recovery, however, does not necessarily indicate a quick return to earlier levels of growth, especially in an era of disengagement by the federal government and attempts by the private sector to cope with the consequences of the economic downturn.

GERD by Source of Funds

Current $ ('000,000)

	Federal govt.	Provincial govt.	Provincial research organization	Business enterprise	Higher education	Private non-profit	Foreign	TOTAL	Annual rate of change %
1979	1,029	209	3	1,118	430	64	82	2,935	
1980	1,150	249	3	1,406	473	66	101	3,448	17.5
1981	1,416	298	6	1,821	495	80	169	4,285	24.3
1982	1,707	371	2	1,995	603	78	279	5,035	17.5
1983	1,918	384	1	1,927	581	93	444	5,348	6.2
1984	2,200	404	3	2,204	576	98	530	6,015	12.5
1985	2,219	424	7	2,781	642	105	531	6,709	11.5
1986	2,303	468	1	3,061	708	115	564	7,220	7.6
1987	2,317	482	2	3,156	695	140	750	7,542	4.5
1988	2,436	544	3	3,369	694	159	853	8,058	6.8
1989	2,587	580	3	3,583	736	172	907	8,568	6.3
1990	2,706	618	3	3,818	795	190	967	9,097	6.2

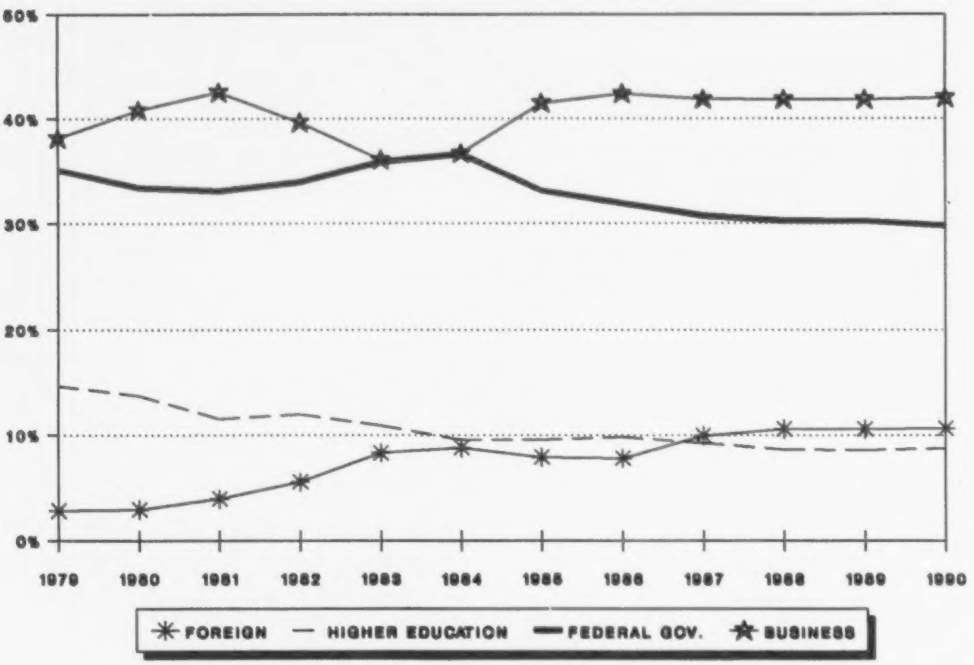
Constant 1986 $ ('000,000)

1979	1,559	317	5	1,694	652	97	124	4,447	
1980	1,575	341	4	1,926	648	90	138	4,723	6.2
1981	1,750	368	7	2,251	612	99	209	5,297	12.1
1982	1,942	422	2	2,270	686	89	317	5,728	8.1
1983	2,078	416	1	2,088	629	101	481	5,794	1.2
1984	2,311	424	3	2,315	605	103	557	6,318	9.0
1985	2,271	434	7	2,846	657	107	544	6,867	8.7
1986	2,303	468	1	3,061	708	115	564	7,220	5.1
1987	2,211	460	2	3,011	663	134	716	7,197	-0.3
1988	2,217	495	3	3,066	631	145	776	7,332	1.9
1989	2,246	503	3	3,110	639	149	787	7,438	1.4
1990	2,278	520	3	3,214	669	160	814	7,657	3.0

Percentage Distribution

	%	%	%	%	%	%	%	%
1979	35.1	7.1	0.1	38.1	14.7	2.2	2.8	100.0
1980	33.4	7.2	0.1	40.8	13.7	1.9	2.9	100.0
1981	33.0	7.0	0.1	42.5	11.6	1.9	3.9	100.0
1982	33.9	7.4	0.0	39.6	12.0	1.5	5.5	100.0
1983	35.9	7.2	0.0	36.0	10.9	1.7	8.3	100.0
1984	36.6	6.7	0.0	36.6	9.6	1.6	8.8	100.0
1985	33.1	6.3	0.1	41.5	9.6	1.6	7.9	100.0
1986	31.9	6.5	0.0	42.4	9.8	1.6	7.8	100.0
1987	30.7	6.4	0.0	41.8	9.2	1.9	9.9	100.0
1988	30.2	6.8	0.0	41.8	8.6	2.0	10.6	100.0
1989	30.2	6.8	0.0	41.8	8.6	2.0	10.6	100.0
1990	29.7	6.8	0.0	42.0	8.7	2.1	10.6	100.0

GERD BY SOURCE OF FUNDS



The main sources of R&D funds are the business sector and the federal government. Other sources include the university sector, provincial governments, non-profit organizations and foreign sources.

The greatest growth was in the business sector's contribution which rose by more than 90% (constant dollars) from 1979 to 1990. This sector's share of total R&D funding in 1990 was 42%. However, the proportion had peaked at 42.5% in 1981, a level that it never regained throughout the decade.

The largest drop in relative R&D funding occurred in the federal government's share, which dropped to 30% in 1990 from 35% in 1979. This decline is significant, since total funding increased by 46% over the period.

Like the federal government, the university sector is losing ground in its relative share of R&D funding. Its contribution shrank, from almost 15% in 1979 to less than 9% in 1990.

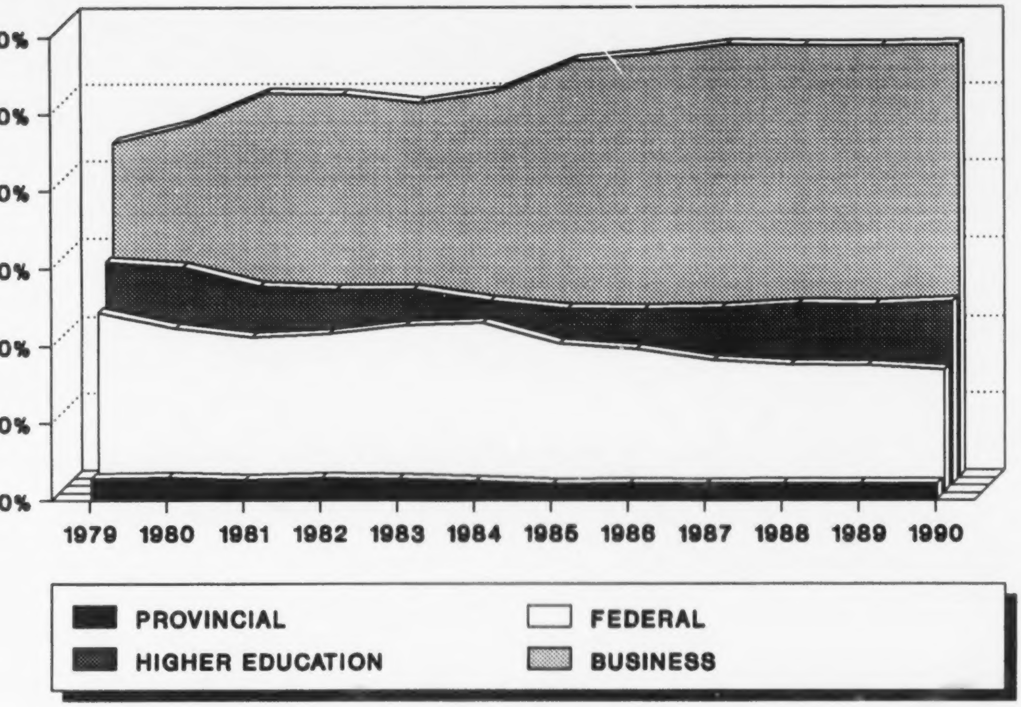
By contrast, the contribution to R&D of non-national sources has grown considerably, from less than 3% of funding in 1979 to more than 10% in 1990. This growth is attributable, in part, to a fairly recent trend among some companies with head offices outside Canada to conduct R&D work in Canada and to requests for R&D work from foreign subsidiaries of Canadian companies.

GERD by Performer

Current $ ('000,000)

	Federal govt.	Provincial govt.	Provincial research organ.	Business enterprises	Higher education	Private non-profit	Total
1979	682	80	33	1,266	844	30	2,935
1980	733	97	42	1,571	970	35	3,448
1981	859	109	52	2,124	1,098	43	4,285
1982	1,033	138	57	2,489	1,269	49	5,035
1983	1,156	141	59	2,585	1,348	59	5,348
1984	1,316	139	67	2,994	1,430	69	6,015
1985	1,286	134	78	3,610	1,525	76	6,709
1986	1,334	149	68	3,949	1,635	85	7,220
1987	1,281	151	77	4,216	1,720	97	7,542
1988	1,322	165	80	4,492	1,881	118	8,058
1989	1,403	175	85	4,775	1,994	136	8,568
1990	1,433	183	88	5,083	2,154	156	9,097
Constant 1986 $ ('000,000)							
1979	1,033	121	50	1,918	1,279	45	4,447
1980	1,004	133	58	2,152	1,329	48	4,723
1981	1,062	135	64	2,625	1,357	53	5,297
1982	1,175	157	65	2,832	1,444	56	5,728
1983	1,252	153	64	2,801	1,460	64	5,794
1984	1,382	146	70	3,145	1,502	72	6,318
1985	1,316	137	80	3,695	1,561	78	6,867
1986	1,334	149	68	3,949	1,635	85	7,220
1987	1,222	144	73	4,023	1,641	93	7,197
1988	1,203	150	73	4,087	1,712	107	7,332
1989	1,218	152	74	4,145	1,731	118	7,438
1990	1,206	154	74	4,279	1,813	131	7,657
Percentage Distribution							
	%	%	%	%	%	%	%
1979	23.2	2.7	1.1	43.1	28.8	1.0	100.0
1980	21.3	2.8	1.2	45.6	28.1	1.0	100.0
1981	20.0	2.5	1.2	49.6	25.6	1.0	100.0
1982	20.5	2.7	1.1	49.4	25.2	1.0	100.0
1983	21.6	2.6	1.1	48.3	25.2	1.1	100.0
1984	21.9	2.3	1.1	49.8	23.8	1.1	100.0
1985	19.2	2.0	1.2	53.8	22.7	1.1	100.0
1986	18.5	2.1	0.9	54.7	22.6	1.2	100.0
1987	17.0	2.0	1.0	55.9	22.8	1.3	100.0
1988	16.4	2.0	1.0	55.7	23.3	1.5	100.0
1989	16.4	2.0	1.0	55.7	23.3	1.6	100.0
1990	15.8	2.0	1.0	55.9	23.7	1.7	100.0

GERD BY PERFORMER



Gross domestic expenditure on research and development (GERD) amounted to almost 9.1 billion in 1990, reflecting real growth of 72% since 1979. But while R&D expenditures made by all performers rose during this period, rates of growth varied dramatically. As a result, the relative shares of total GERD conducted by different performers shifted.

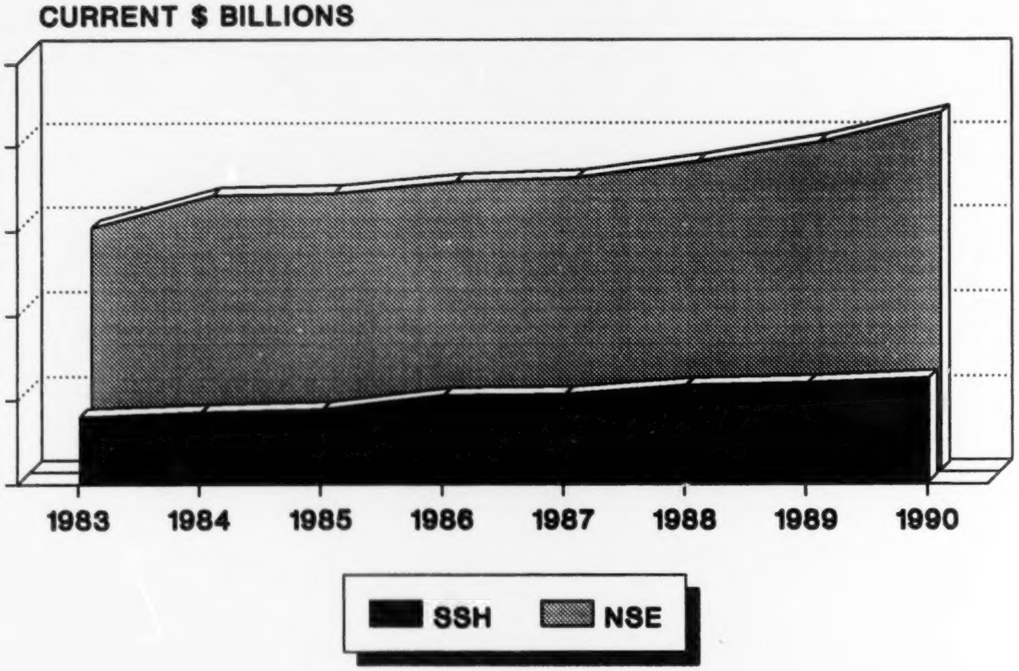
For instance, the federal government and the university sector experienced a significant decline in their relative shares, despite an increase in their expenditures' levels. The decline in the federal government's share from 23% in 1979 to less than 16% in 1990, may be explained, in part, by the strategies of retrenchment and targeting fields and technologies for research.

The same trend of higher spending but smaller relative shares occurred in the university sector, the only difference being a slight recovery that began in 1988. On the other hand, the business sector is playing an increasingly predominant role. Its relative share of GERD rose from 43% to 56%, at the expense of the federal government, universities, and to some extent, the provincial governments. This rise in the business sector results from both more active participation by small industrial firms in R&D and some retreat by the federal government.

Federally-Financed R&D
by Performer and Field of Study

	Intramural	Canadian industry	Canadian universities	Canadian non-profit	Provincial governments	Foreign performers	Other	Total	Change %
Natural Sciences and Engineering (Current $ '000)									
1983	1,726,120	465,893	477,039	28,137	34,349	114,398	26,034	2,871,970	
1984	1,975,578	543,426	526,011	22,851	31,458	123,607	28,355	3,251,286	13.2
1985	1,956,206	584,074	534,818	17,764	25,624	129,671	29,232	3,277,389	0.8
1986	2,049,415	606,762	545,547	16,720	25,131	142,136	29,701	3,415,412	4.2
1987	2,007,703	658,608	565,556	24,847	27,559	144,653	33,012	3,461,938	1.4
1988	2,051,638	737,491	609,611	27,182	26,943	163,583	38,359	3,654,807	5.6
1989	2,209,872	741,747	652,867	37,033	48,709	159,149	38,980	3,888,357	6.4
1990	2,316,754	878,782	770,750	41,508	42,487	151,463	37,498	4,239,242	9.0
Social Sciences and Humanities (Current $ '000)									
1983	572,982	20,321	88,398	18,574	7,631	63,076	11,118	782,100	
1984	580,295	26,715	109,708	21,398	12,002	70,950	10,188	831,256	6.3
1985	614,248	26,296	102,275	23,805	8,057	76,024	11,742	862,447	3.8
1986	741,031	27,626	116,104	36,019	10,425	91,432	10,710	1,033,347	19.8
1987	712,623	43,749	130,901	52,629	8,291	79,528	16,311	1,044,032	1.0
1988	775,488	55,204	151,088	54,628	6,991	88,760	22,482	1,154,641	10.6
1989	816,104	38,699	154,139	49,792	6,705	87,346	25,449	1,178,234	2.0
1990	858,461	44,405	166,334	46,869	7,843	90,829	25,096	1,239,837	5.2
All Sciences (Current $ '000)									
1983	2,299,102	486,214	565,437	46,711	41,980	177,474	37,152	3,654,070	
1984	2,555,873	570,141	635,719	44,249	43,460	194,557	38,543	4,082,542	11.7
1985	2,570,454	610,370	637,093	41,569	33,681	205,695	40,974	4,139,836	1.4
1986	2,790,446	634,388	661,651	52,739	35,556	233,568	40,411	4,448,759	7.5
1987	2,720,326	702,357	696,457	77,476	35,850	224,181	49,323	4,505,970	1.3
1988	2,827,126	792,695	760,699	81,810	33,934	252,343	60,841	4,809,448	6.7
1989	3,025,976	780,446	807,006	86,825	55,414	246,495	64,429	5,066,591	5.3
1990	3,175,215	923,187	937,084	88,377	50,330	242,292	62,594	5,479,079	8.1
All Sciences (Constant 1986 $ '000)									
1983	2,490,901	526,776	612,608	50,608	45,482	192,280	40,251	3,958,906	
1984	2,684,741	598,888	667,772	46,480	45,651	204,367	40,486	4,288,384	8.3
1985	2,630,966	624,739	652,091	42,548	34,474	210,537	41,939	4,237,294	-1.2
1986	2,790,446	634,388	661,651	52,739	35,556	233,568	40,411	4,448,759	5.0
1987	2,595,731	670,188	664,558	73,927	34,208	213,913	47,064	4,299,590	-3.4
1988	2,572,453	721,288	692,174	74,440	30,877	229,611	55,360	4,376,204	1.8
1989	2,626,715	677,470	700,526	75,369	48,102	213,971	55,928	4,398,082	0.5
1990	2,672,740	777,093	788,791	74,391	42,365	203,949	52,689	4,612,019	4.9
Percentage Distribution (All Sciences)									
	%	%	%	%	%	%	%	%	
1983	62.9	13.3	15.5	1.3	1.1	4.9	1.0	100.0	
1984	62.6	14.0	15.6	1.1	1.1	4.8	0.9	100.0	
1985	62.1	14.7	15.4	1.0	0.8	5.0	1.0	100.0	
1986	62.7	14.3	14.9	1.2	0.8	5.3	0.9	100.0	
1987	60.4	15.6	15.5	1.7	0.8	5.0	1.1	100.0	
1988	58.8	16.5	15.8	1.7	0.7	5.2	1.3	100.0	
1989	59.7	15.4	15.9	1.7	1.1	4.9	1.3	100.0	
1990	58.0	16.8	17.1	1.6	0.9	4.4	1.1	100.0	

FEDERALLY-FINANCED R&D BY FIELD OF STUDY



R&D efforts encompass all expenditures intended to increase knowledge (including knowledge of humans, culture and society) and to use that knowledge for new applications. Federal government funding covers internal R&D expenditures, contracts, R&D grants and contributions, research scholarships, administration of external programs and capital expenditures for these purposes.

The federal government's total funding for R&D amounted to $5.5 billion in 1990. This represents a 16% increase (in constant dollars) since 1983. In 1990, as in 1983, 80% of the expenditures were devoted to the natural sciences.

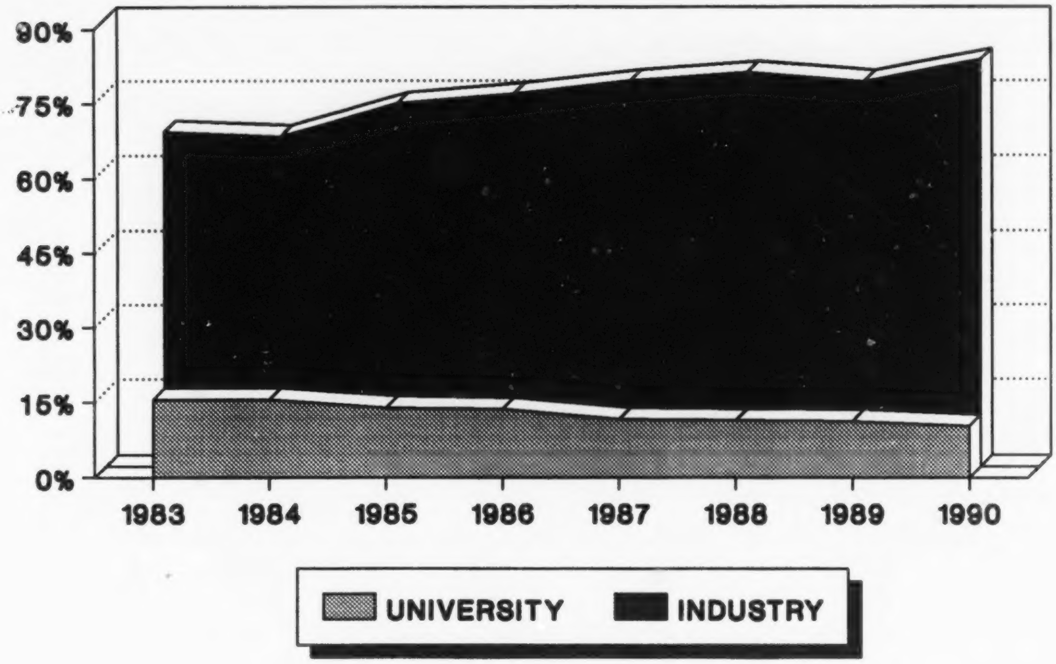
R&D performed by the federal government itself absorbed the largest proportion of these funds, although the in-house share has declined from 63% in 1983 to 58% in 1990. Universities and industry receive fairly similar amounts (about 17% in 1990), although the latter's share is rising faster, especially in the natural sciences.

Federal R&D expenditures rose faster in the social sciences (23%) than in the natural sciences (15%) in real terms. Funds allocated by the federal government to R&D in the social sciences surpassed the billion-dollar mark (current dollars) for the first time in 1986. Most federally-funded R&D work in the social sciences was conducted internally and in universities, which together accounted for almost 83% of these expenditures.

Federal R&D Contracts
by Performer and Science

	Intramural	Canadian industry	Canadian universities	Canadian non-profit	Provincial governments	Foreign	Other	Total	Rate of change %
Natural Sciences and Engineering (Current $ '000)									
1983	1,047	155,332	29,089	2,318	1,483	12,302	17,312	218,883	
1984	1,659	166,181	31,066	5,550	1,825	16,212	15,116	237,609	8.6
1985	1,868	184,547	27,421	2,088	1,017	9,131	14,825	240,897	1.4
1986	1,697	196,066	26,229	1,435	1,559	7,439	13,682	248,107	3.0
1987	1,878	218,856	21,892	2,068	353	7,333	14,263	266,643	7.5
1988	396	254,683	24,548	2,129	647	5,894	14,533	302,830	13.6
1989	1,666	258,634	26,956	2,544	1,032	13,325	14,375	318,532	5.2
1990	979	365,190	33,831	4,972	1,011	10,119	12,824	428,926	34.7
Social Sciences and Humanities (Current $ '000)									
1983	153	3,546	7,813	1,597	94	74	4,684	17,961	
1984	105	3,923	8,906	2,294	587	91	3,753	19,659	9.5
1985	0	3,099	8,513	2,004	317	35	3,118	17,086	-13.1
1986	8	3,282	10,118	2,217	761	134	2,276	18,796	10.0
1987	1,047	3,037	11,361	2,225	144	550	2,028	20,392	8.5
1988	1,519	2,898	12,444	2,292	255	1,978	2,013	23,399	14.7
1989	2,073	3,549	11,119	2,047	105	610	1,966	21,469	-8.2
1990	2,013	3,839	12,375	2,211	128	686	2,137	23,389	8.9
All Sciences (Current $ '000)									
1983	1,200	158,878	36,902	3,915	1,577	12,376	21,996	236,844	
1984	1,764	170,104	39,972	7,844	2,412	16,303	18,869	257,268	8.6
1985	1,868	187,646	35,934	4,092	1,334	9,166	17,943	257,983	0.3
1986	1,705	199,348	36,347	3,652	2,320	7,573	15,958	266,903	3.5
1987	2,925	221,893	33,253	4,293	497	7,883	16,291	287,035	7.5
1988	1,915	257,581	36,992	4,421	902	7,872	16,546	326,229	13.7
1989	3,739	262,183	38,075	4,591	1,137	13,935	16,341	340,001	4.2
1990	2,992	369,029	46,206	7,183	1,139	10,805	14,961	452,315	33.0
All Sciences (Constant 1986 $ '000)									
1983	1,300	172,132	39,980	4,242	1,709	13,408	23,831	256,602	
1984	1,853	178,681	41,987	8,239	2,534	17,125	19,820	270,239	5.3
1985	1,912	192,063	36,780	4,188	1,365	9,382	18,365	264,056	-2.3
1986	1,705	199,348	36,347	3,652	2,320	7,573	15,958	266,903	1.1
1987	2,791	211,730	31,730	4,096	474	7,522	15,545	273,888	2.6
1988	1,742	234,378	33,660	4,023	821	7,163	15,056	296,842	8.4
1989	3,246	227,589	33,051	3,985	987	12,096	14,185	295,140	-0.6
1990	2,519	310,630	38,894	6,046	959	9,095	12,593	380,737	29.0
Percentage Distribution (All Sciences)									
	%	%	%	%	%	%	%	%	
1983	0.5	67.1	15.6	1.7	0.7	5.2	9.3	100.0	
1984	0.7	66.1	15.5	3.0	0.9	6.3	7.3	100.0	
1985	0.7	72.7	13.9	1.6	0.5	3.6	7.0	100.0	
1986	0.6	74.7	13.6	1.4	0.9	2.8	6.0	100.0	
1987	1.0	77.3	11.6	1.5	0.2	2.7	5.7	100.0	
1988	0.6	79.0	11.3	1.4	0.3	2.4	5.1	100.0	
1989	1.1	77.1	11.2	1.4	0.3	4.1	4.8	100.0	
1990	0.7	81.6	10.2	1.6	0.3	2.4	3.3	100.0	

FEDERAL R&D CONTRACTS BY PERFORMER



Research and development contracts are awarded to performers external to the federal government for the conduct of R&D by the recipients or to provide support for the federal government's in-house R&D program. Overall, this category amounted to $452.3 million in 1990 from $236.8 million in 1983. In constant dollars, this increase is translated into a real growth of 48%.

Almost all R&D contracts are awarded in the natural sciences. In 1990, these disciplines accounted for 95%, up from 92% in 1983. Moreover, from 1983 to 1990, funds allocated to the natural sciences rose by 52.3% while those awarded to the social sciences grew by only 1.2% in real terms.

Canadian industry obtains more R&D contracts than any other performer. As well, its share has grown, from 67% in 1983 to more than 81% of the value of contracts in 1990. Contracts secured by industry amount currently to $369 million (current dollars).

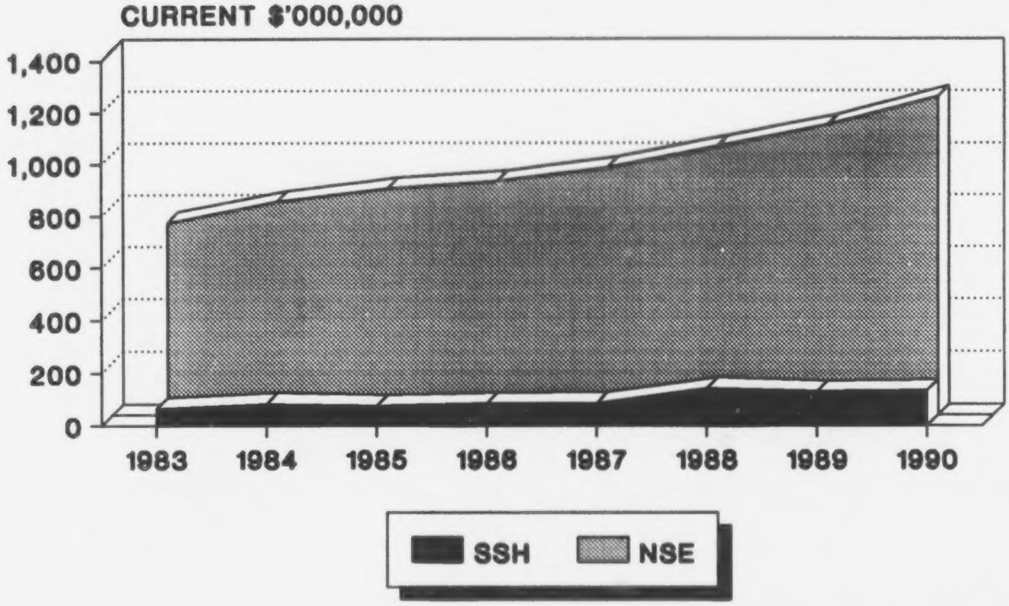
Universities rank second in obtaining R&D contracts. Unlike industry, however, their share declined steadily throughout the period. Universities held 15% of contracts in 1983, but only 10% in 1990. In current dollars, the value of contracts obtained by Canadian universities amounted to 46 million in 1990. In real terms, contracts awarded to universities fell 3% since 1983, compared with a 48% rise in the value of all contracts.

Federal R&D Grants, Contributions and Research Fellowships, by Performer and by Field of Study

Natural Sciences and Engineering (Current $ '000)

	Intramural	Canadian industry	Canadian universities	Canadian non-profit	Provincial governments	Foreign	Other	Total	Rate of change
									%
1983	10,829	220,920	405,073	15,708	2,040	74,824	4,381	733,775	
1984	14,301	251,202	446,413	7,387	10,795	77,737	6,804	814,639	11.0
1985	14,431	279,910	457,441	8,076	8,827	85,960	9,528	864,173	6.1
1986	14,075	280,329	471,673	6,694	16,437	93,880	9,410	892,498	3.3
1987	17,076	299,129	492,901	11,348	18,016	97,754	10,482	946,706	6.1
1988	20,673	317,583	528,870	11,102	18,084	118,198	14,310	1,028,820	8.7
1989	22,486	339,777	566,422	21,053	38,387	108,682	15,721	1,112,528	8.1
1990	21,353	356,917	671,650	22,568	30,905	101,125	15,361	1,219,879	9.6
Social Sciences and Humanities (Current $ '000)									
1983	0	20	40,370	4,827	980	17,723	730	64,650	
1984	0	385	52,052	6,859	950	21,345	1,405	82,996	28.4
1985	0	251	43,171	7,171	796	23,495	1,115	75,999	-8.4
1986	0	135	46,717	8,106	1,802	26,903	1,076	84,739	11.5
1987	0	4,076	47,695	9,112	1,228	23,554	243	85,908	1.4
1988	0	19,582	58,079	24,330	2,499	22,734	14,348	141,572	64.8
1989	0	4,938	59,406	20,929	2,221	26,262	16,161	129,917	-8.2
1990	0	5,038	65,187	20,058	2,038	26,139	15,889	134,349	3.4
All Sciences (Current $ '000)									
1983	10,829	220,940	445,443	20,535	3,020	92,547	5,111	798,425	
1984	14,301	251,587	498,465	14,246	11,745	99,082	8,209	897,635	12.4
1985	14,431	280,161	500,612	15,247	9,623	109,455	10,643	940,172	4.7
1986	14,075	280,464	518,390	14,800	18,239	120,783	10,486	977,237	3.9
1987	17,076	303,205	540,596	20,460	19,244	121,308	10,725	1,032,614	5.7
1988	20,673	337,165	586,949	35,432	20,583	140,932	28,658	1,170,392	13.3
1989	22,486	344,715	625,828	41,982	40,608	134,944	31,882	1,242,445	6.2
1990	21,353	361,955	736,837	42,626	32,943	127,264	31,250	1,354,228	9.0
All Sciences (Constant 1986 $ '000)									
1983	11,732	239,372	482,603	22,248	3,272	100,268	5,537	865,033	
1984	15,022	264,272	523,598	14,964	12,337	104,078	8,623	942,894	9.0
1985	14,771	286,756	512,397	15,606	9,850	112,032	10,894	962,305	2.1
1986	14,075	280,464	518,390	14,800	18,239	120,783	10,486	977,237	1.6
1987	16,294	289,318	515,836	19,523	18,363	115,752	10,234	985,319	0.8
1988	18,811	306,793	534,076	32,240	18,729	128,237	26,076	1,064,961	8.1
1989	19,519	299,232	543,253	36,443	35,250	117,139	27,675	1,078,511	1.3
1990	17,974	304,676	620,233	35,880	27,730	107,125	26,305	1,139,923	5.7
Percentage Distribution (All Sciences)									
	%	%	%	%	%	%	%	%	
1983	1.4	27.7	55.8	2.6	0.4	11.6	0.6	100.0	
1984	1.6	28.0	55.5	1.6	1.3	11.0	0.9	100.0	
1985	1.5	29.8	53.2	1.6	1.0	11.6	1.1	100.0	
1986	1.4	28.7	53.0	1.5	1.9	12.4	1.1	100.0	
1987	1.7	29.4	52.4	2.0	1.9	11.7	1.0	100.0	
1988	1.8	28.8	50.1	3.0	1.8	12.0	2.4	100.0	
1989	1.8	27.7	50.4	3.4	3.3	10.9	2.6	100.0	
1990	1.6	26.7	54.4	3.1	2.4	9.4	2.3	100.0	

FEDERAL R&D GRANTS, CONTRIBUTIONS AND RESEARCH FELLOWSHIPS BY FIELD OF STUDY



Grants and contributions are funds paid to organizations or individuals performing R&D work, rather than provide them with goods, services and information. Research fellowships are financial support to individuals to obtain advanced education in research and acquire experience. These should not be confused with "education support" which provides assistance to students to continue their studies (including postdoctoral studies).

In 1990, the federal government awarded more than $1.35 billion (current dollars) in R&D grants and contributions, and research fellowships. When allowance is made for inflation, this represents a 30% increase over 1983. From 1983 to 1990, an average of 90% of funds paid out as R&D grants and contributions, and research fellowships went to the natural sciences and engineering. As well, the amount increased every year. The university sector received more than half of these funds, followed by industry which received a third.

Unlike the situation in the natural sciences and engineering, the amounts allocated to the social sciences and humanities varied considerably from year to year and between performers. For example, the funds assigned to industry and foreign performers between 1983 and 1990 fluctuated substantially.

Finally, it should be noted that the university sector's relative share of R&D grants and contributions and research fellowships has tended to decline, especially in the social sciences and humanities.

Granting Councils' Expenditures
Support in Canadian Universities

Total Expenditures

Current $ ('000) **Percentage Distribution**

	MRC	NSERC	SSHRC	TOTAL	MRC %	NSERC %	SSHRC %	TOTAL %
1983	140,683	282,105	60,468	483,256	29.1	58.4	12.5	100.0
1984	157,046	312,725	63,241	533,012	29.5	58.7	11.9	100.0
1985	161,602	311,302	63,663	536,567	30.1	58.0	11.9	100.0
1986	168,311	320,940	70,582	559,833	30.1	57.3	12.6	100.0
1987	175,125	339,365	70,691	585,181	29.9	58.0	12.1	100.0
1988	189,052	365,880	76,358	631,290	29.9	58.0	12.1	100.0
1989[p]	202,881	393,516	82,447	678,844	29.9	58.0	12.1	100.0
1990[p]	240,104	468,393	90,948	799,445	30.0	58.6	11.4	100.0

Constant 1986 $ ('000) **Annual Rate of Change**

					%	%	%	%
1983	152,419	305,639	65,512	523,571				
1984	164,964	328,493	66,430	559,887	8.2	7.5	1.4	6.9
1985	165,406	318,631	65,162	549,199	0.3	-3.0	-1.9	-1.9
1986	168,311	320,940	70,582	559,833	1.8	0.7	8.3	1.9
1987	167,104	323,822	67,453	558,379	-0.7	0.9	-4.4	-0.3
1988	172,022	332,921	69,480	574,422	2.9	2.8	3.0	2.9
1989[p]	176,112	341,594	71,569	589,274	2.4	2.6	3.0	2.6
1990[p]	202,108	394,270	76,556	672,934	14.8	15.4	7.0	14.2

Rate of Change

	%	%	%	%
1990/1983	32.6	29.0	16.9	28.5

Grants and contributions

Constant 1986 $ ('000)

1983	133,132	248,828	32,905	414,865				
1984	144,607	259,946	33,774	438,328	8.6	4.5	2.6	5.7
1985	144,514	249,372	29,523	423,408	-0.1	-4.1	-12.6	-3.4
1986	145,536	252,707	30,600	428,843	0.7	1.3	3.6	1.3
1987	145,331	257,764	35,787	438,883	-0.1	2.0	17.0	2.3
1988	149,571	265,134	36,527	451,231	2.9	2.9	2.1	2.8
1989[p]	153,122	270,764	39,548	463,433	2.4	2.1	8.3	2.7
1990[p]	178,115	320,316	41,469	539,901	16.3	18.3	4.9	16.5

Human Resources Development

Constant 1986 $ ('000)

1983	14,803	47,947	19,138	81,887				
1984	15,353	55,008	19,341	89,703	3.7	14.7	1.1	9.5
1985	15,931	56,541	20,571	93,044	3.8	2.8	6.4	3.7
1986	17,120	54,469	24,032	95,621	7.5	-3.7	16.8	2.8
1987	16,356	52,722	17,527	86,605	-4.5	-3.2	-27.1	-9.4
1988	16,520	52,736	18,763	88,018	1.0	0.0	7.1	1.6
1989	16,739	54,398	17,881	89,018	1.3	3.2	-4.7	1.1
1990	17,553	56,488	20,868	94,909	4.9	3.8	16.7	6.6

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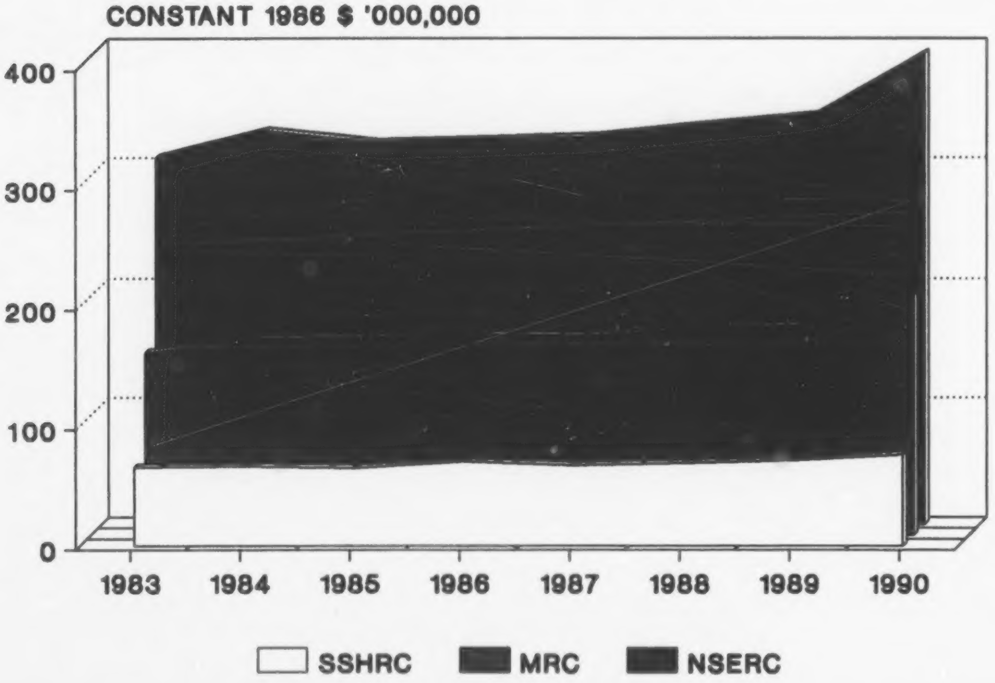
[p] Includes Networks of Centres of Excellence.

GRANTING COUNCILS' EXPENDITURES



As part of its R&D funding, the federal government provides direct support for university research through three granting councils : the Medical Research Council (MRC), the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC). The granting councils' expenditures amounted to $800 million in 1990. In real terms, this was an increase of 29% over 1983. Over 90% of their expenditures was devoted to grants, contributions and human resource development over the period.

Between 1983 and 1990, the MRC had the largest increase in spending. Its total expenditures rose by 33% and 87% of its bugdet was allocated to grants and contributions compared with close to 10% for human resource development. Throughout the period, the MRC accounted for one third of the granting councils' total expenditures.

The NSERC alone had made more than half of all granting councils' expenditures. In 1990, its expenditures amounted to $468 million. In real terms, this was a 29% increase over 1983. On average, 80% of its budget was spent on grants and contributions and 16% on human resource development programs.

Of all the granting councils, the SSHRC allocated the largest proportion of its budget to human resource development. In constant dollar terms, SSHRC's expenditures rose by 17% between 1983 and 1990, notwithstanding a relatively significant drop of 4.4% in 1987. Also in 1987, grants and contributions expenditures increased 17% while human resource development funds fell by 27%. The latter decline was due to the termination of major human resource program.

It should be noted that the 1990's expenditures for the three granting councils include funds for Networks of Centres of Excellence.

HERD by Source of Funds

Current $ ('000,000)

	Federal govt.	Provincial govt.	Business enterprise	Higher education	Private non-profit	Foreign	TOTAL	Rate of Change %
1979	234	76	51	430	46	7	844	
1980	288	96	56	473	49	8	970	14.9
1981	354	114	68	495	58	9	1,098	13.2
1982	393	142	68	603	53	10	1,269	15.6
1983	457	153	80	581	66	11	1,348	6.2
1984	517	169	87	576	70	11	1,430	6.1
1985	515	178	102	642	80	8	1,525	6.6
1986	523	207	105	708	81	11	1,635	7.2
1987	561	217	136	695	99	12	1,720	5.2
1988	625	261	175	694	113	13	1,881	9.4
1989	662	277	186	736	119	14	1,994	6.0
1990	715	299	201	795	129	15	2,154	8.0

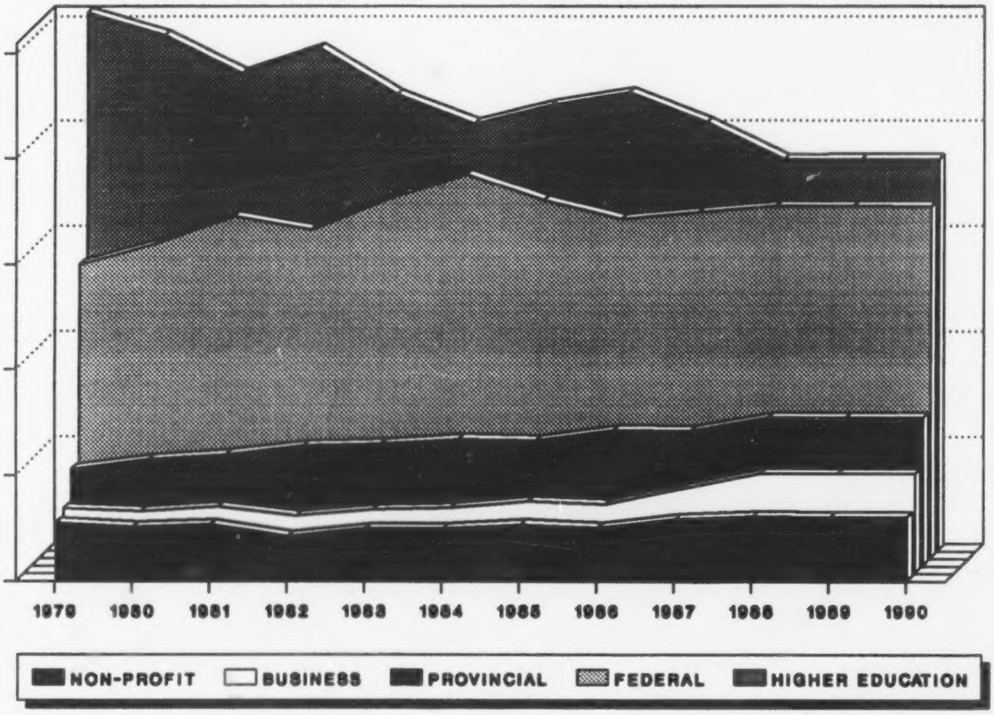
Constant 1986 $ ('000,000)

	Federal govt.	Provincial govt.	Business enterprise	Higher education	Private non-profit	Foreign	TOTAL	Rate of Change %
1979	355	115	77	652	70	11	1,279	
1980	395	132	77	648	67	11	1,329	3.9
1981	438	141	84	612	72	11	1,357	2.1
1982	447	162	77	686	60	11	1,444	6.4
1983	495	166	87	629	72	12	1,460	1.2
1984	543	178	91	605	74	12	1,502	2.9
1985	527	182	104	657	82	8	1,561	3.9
1986	523	207	105	708	81	11	1,635	4.7
1987	535	207	130	663	94	11	1,641	0.4
1988	569	237	159	631	103	12	1,712	4.3
1989	575	240	161	639	103	12	1,731	1.1
1990	602	252	169	669	109	13	1,813	4.8

Percentage Distribution

	%	%	%	%	%	%	%
1979	27.7	9.0	6.0	50.9	5.5	0.8	100.0
1980	29.7	9.9	5.8	48.8	5.1	0.8	100.0
1981	32.2	10.4	6.2	45.1	5.3	0.8	100.0
1982	31.0	11.2	5.4	47.5	4.2	0.8	100.0
1983	33.9	11.4	5.9	43.1	4.9	0.8	100.0
1984	36.2	11.8	6.1	40.3	4.9	0.8	100.0
1985	33.8	11.7	6.7	42.1	5.2	0.5	100.0
1986	32.0	12.7	6.4	43.3	5.0	0.7	100.0
1987	32.6	12.6	7.9	40.4	5.8	0.7	100.0
1988	33.2	13.9	9.3	36.9	6.0	0.7	100.0
1989	33.2	13.9	9.3	36.9	6.0	0.7	100.0
1990	33.2	13.9	9.3	36.9	6.0	0.7	100.0

HERD BY SOURCE OF FUNDS



Higher education expenditures on research and development (HERD) amounted to $2.15 billion in 1990. This represents a 42% increase (constant dollars) over 1979. The main sources of funds for HERD are the university sector itself and the federal government. Over the last decade, however, the relative importance of the university sector declined, while that of most other sources rose.

In 1979, the university sector was its own major source of funds, contributing more than half of total expenditures. But by 1988, this share had fallen to 37%. By contrast, the federal government's contribution rose from 27% to more than 33% of total support of higher education research.

The provincial governments and private business have also played a growing role, as their financial support more than doubled since 1979 (in constant dollars). Provincial administrations provided almost 14% of total funding for R&D conducted by the university sector in 1990, up from 9% in 1979. At the same time, the business sector's share grew from 6% to more than 9%.

HERD and GDP
by Province

HERD

CURRENT $ ('000,000)

	NFLD	PEI	NS	NB	QC	ONT	MAN	SASK	ALT	BC	CANADA[P]
1979	16.8	0.8	27.8	13.6	204.8	332.9	41.4	28.0	100.0	77.9	844.0
1980	19.5	0.8	32.4	16.2	230.7	375.4	44.7	35.0	118.2	97.3	970.2
1981	21.1	0.9	37.5	11.9	260.3	429.8	52.2	30.7	144.7	109.4	1,098.5
1982	23.8	1.2	37.8	19.4	278.9	499.9	61.9	39.4	188.0	118.9	1,269.2
1983	25.1	1.1	42.4	21.9	290.8	550.5	69.1	41.5	185.6	120.8	1,348.8
1984	25.4	1.2	47.5	22.9	317.3	578.4	72.4	45.7	194.0	125.1	1,429.9
1985	28.3	1.5	51.9	24.6	343.3	617.7	74.1	49.2	207.7	126.5	1,524.8
1986	30.6	5.1	54.1	25.6	355.1	667.4	78.9	51.4	239.4	126.5	1,634.1
1987	35.2	2.7	56.7	28.8	390.0	710.4	80.8	52.0	226.2	136.4	1,719.2
1988	39.2	2.7	63.7	29.2	437.5	780.7	84.6	57.0	231.3	155.4	1,881.3

Percentage Distribution

	%	%	%	%	%	%	%	%	%	%	%
1979	1.99	0.09	3.29	1.61	24.27	39.44	4.91	3.32	11.85	9.23	100.00
1980	2.01	0.08	3.34	1.67	23.78	38.69	4.61	3.61	12.18	10.03	100.00
1981	1.92	0.08	3.41	1.08	23.70	39.13	4.75	2.79	13.17	9.96	100.00
1982	1.88	0.09	2.98	1.53	21.97	39.39	4.88	3.10	14.81	9.37	100.00
1983	1.86	0.08	3.14	1.62	21.56	40.81	5.12	3.08	13.76	8.96	100.00
1984	1.78	0.08	3.32	1.60	22.19	40.45	5.06	3.20	13.57	8.75	100.00
1985	1.86	0.10	3.40	1.61	22.51	40.51	4.86	3.23	13.62	8.30	100.00
1986	1.87	0.31	3.31	1.57	21.73	40.84	4.83	3.15	14.65	7.74	100.00
1987	2.05	0.16	3.30	1.68	22.68	41.32	4.70	3.02	13.16	7.93	100.00
1988	2.08	0.14	3.39	1.55	23.26	41.50	4.50	3.03	12.29	8.26	100.00

GDP

CURRENT $ ('000,000)

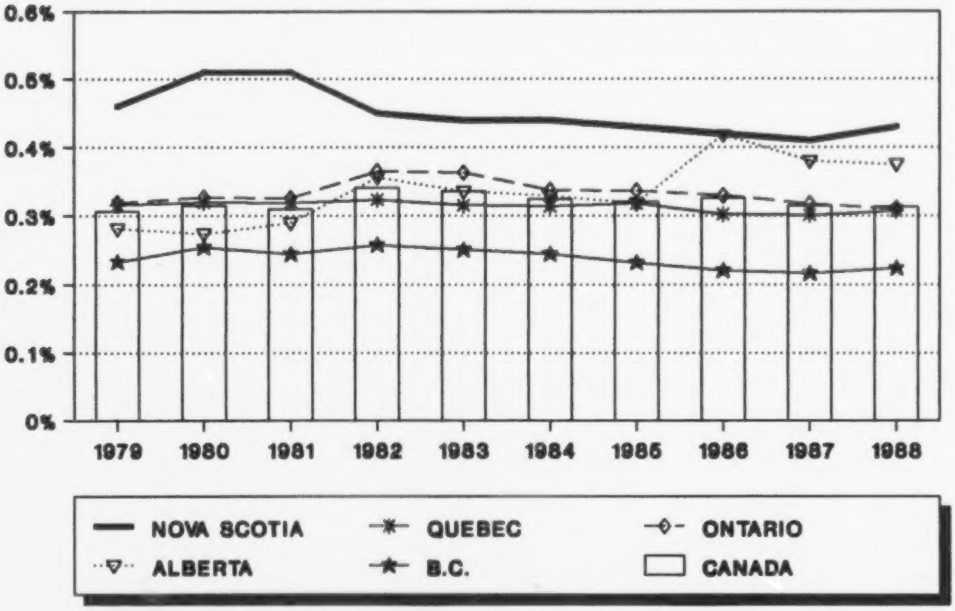
1979	3,907	786	6,093	5,385	64,939	104,363	10,319	10,468	35,480	33,360	275,100
1980	4,095	846	6,292	5,019	72,220	114,994	11,188	12,400	43,148	38,239	308,441
1981	4,643	1,009	7,345	5,953	81,513	131,831	13,160	14,339	49,934	44,691	354,418
1982	5,059	1,051	8,462	6,527	86,228	137,310	14,014	14,760	52,896	46,115	372,422
1983	5,485	1,165	9,629	7,493	92,274	151,945	14,911	15,235	55,386	48,151	401,674
1984	5,947	1,297	10,701	8,375	100,991	171,499	16,520	16,390	58,941	51,119	441,780
1985	6,368	1,320	11,934	9,007	107,944	183,561	17,661	17,436	65,351	54,499	475,081
1986	6,782	1,498	13,031	10,079	117,493	202,710	18,421	17,145	57,317	57,342	501,818
1987	7,385	1,587	13,967	10,887	129,593	223,775	19,542	17,191	59,614	62,866	546,407
1988	7,912	1,781	14,898	11,764	142,417	251,325	21,541	18,120	61,810	69,291	600,859

HERD as a Percent of GDP

	%	%	%	%	%	%	%	%	%	%	%
1979	0.43	0.10	0.46	0.25	0.32	0.32	0.40	0.27	0.28	0.23	0.31
1980	0.48	0.09	0.51	0.32	0.32	0.33	0.40	0.28	0.27	0.25	0.31
1981	0.45	0.09	0.51	0.20	0.32	0.33	0.40	0.21	0.29	0.24	0.31
1982	0.47	0.11	0.45	0.30	0.32	0.36	0.44	0.27	0.36	0.26	0.34
1983	0.46	0.09	0.44	0.29	0.32	0.36	0.46	0.27	0.34	0.25	0.34
1984	0.43	0.09	0.44	0.27	0.31	0.34	0.44	0.28	0.33	0.24	0.32
1985	0.44	0.11	0.43	0.27	0.32	0.34	0.42	0.28	0.32	0.23	0.32
1986	0.45	0.34	0.42	0.25	0.30	0.33	0.43	0.30	0.42	0.22	0.33
1987	0.48	0.17	0.41	0.26	0.30	0.32	0.41	0.30	0.38	0.22	0.31
1988	0.50	0.15	0.43	0.25	0.31	0.31	0.39	0.31	0.37	0.22	0.31

[P] Territories not included.

HERD AS A PERCENT OF GDP BY PROVINCE



Research and development performed by the university sector (HERD) amounted to more than $1.8 billion in 1988. This was a 120% increase over 1979 (current dollars). Increases were particularly strong between 1979 and 1982, with annual growth rates ranging from 13% to 15%. These years of strong growth were followed by a period of fairly moderate growth during which the rate of increase was halved.

Quebec and Ontario together accounted for more than 60% of HERD between 1979 and 1988. However, Ontario's share increased over this period.

Alberta ranked third in volume of HERD, although its share fluctuated between 12% and 15%. As well, the strongest growth was in Alberta, where the HERD/GDP ratio rose from 0.28% in 1979 to 0.37% in 1988 and peaked at 0.42% in 1986.

British Columbia's HERD seems disproportionately small relative to its economic potential. Although the amount invested in British Columbia's universities R&D in 1988 was four times higher ($155.4 million) than Newfoundland's ($39.2 million), the ratio of their GDPs was nine to one.

Newfoundland, Nova Scotia, and Manitoba had high HERD/GDP ratios (above 0.40%), despite their relatively small university R&D expenditures.

GERD in G7 Countries

GERD as Percent of GDP

	CANADA %	FRANCE %	GERMANY[1] %	ITALY %	JAPAN[2] %	UK %	USA %
1981	1.21	1.97	2.42	0.87	2.14	2.41	2.45
1982	1.35	2.06	..	0.90	2.23	..	2.62
1983	1.33	2.11	2.51	0.95	2.36	2.24	2.71
1984	1.36	2.21	..	1.01	2.45	..	2.78
1985	1.41	2.25	2.71	1.12	2.62	2.31	2.93
1986	1.44	2.23	..	1.14	2.59	2.34	2.91
1987	1.38	2.28	2.86	1.19	2.67	2.25	2.87
1988	1.35	2.29	2.83	1.23	2.72	2.20	2.83
1989[P]	1.33	2.32	2.88	1.29	2.85	..	2.82
1990[E]	1.35	2.39	2.82	1.28	..	..	2.79

GERD as a Percent of GDP Index (Canada = 100)

	CANADA	FRANCE	GERMANY[1]	ITALY	JAPAN[2]	UK	USA
1981	100.0	162.8	199.7	72.1	176.4	199.0	202.1
1982	100.0	152.4	..	66.6	164.7	..	193.4
1983	100.0	158.9	189.1	71.6	177.7	168.8	204.2
1984	100.0	161.8	..	73.9	179.8	..	203.7
1985	100.0	159.3	191.3	79.4	185.0	163.3	207.0
1986	100.0	155.2	..	78.9	180.2	162.6	202.2
1987	100.0	165.3	207.0	86.6	193.3	162.9	207.7
1988	100.0	170.3	210.3	91.0	201.9	163.2	210.4
1989[P]	100.0	175.0	217.0	97.4	214.8	..	212.7
1990[E]	100.0	177.6	209.3	95.0	..	..	207.2

GERD per Capita (1985 $ PPP[3])

	CANADA	FRANCE	GERMANY[1]	ITALY	JAPAN[2]	UK	USA
1981	173.9	221.2	274.0	90.1	222.1	238.9	374.9
1982	186.2	235.3	..	93.0	236.7	..	386.5
1983	187.0	241.5	288.2	98.9	256.9	234.5	411.9
1984	202.5	254.8	..	107.5	278.1	..	447.2
1985	218.4	264.1	327.2	122.8	308.8	254.0	484.9
1986	227.8	267.1	..	127.0	312.0	266.9	492.9
1987	224.7	276.8	359.2	137.4	333.2	267.4	497.3
1988	226.5	287.1	367.4	146.6	357.5	273.1	509.1
1989[P]	226.9	299.6	382.0	159.2	391.5	..	516.1

GERD per Capita Index (Canada=100)

	CANADA	FRANCE	GERMANY[1]	ITALY	JAPAN[2]	UK	USA
1981	100.0	127.2	157.6	51.8	127.7	137.4	215.6
1982	100.0	126.4	..	49.9	127.1	..	207.6
1983	100.0	129.2	154.1	52.9	137.4	125.4	220.3
1984	100.0	125.8	..	53.1	137.3	..	220.8
1985	100.0	120.9	149.8	56.2	141.4	116.3	222.0
1986	100.0	117.3	..	55.8	137.0	117.2	216.4
1987	100.0	123.2	159.9	61.2	148.3	119.0	221.4
1988	100.0	126.7	162.2	64.7	157.8	120.5	224.7
1989[P]	100.0	132.0	168.3	70.1	172.5	..	227.4

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[1] Western Germany only.

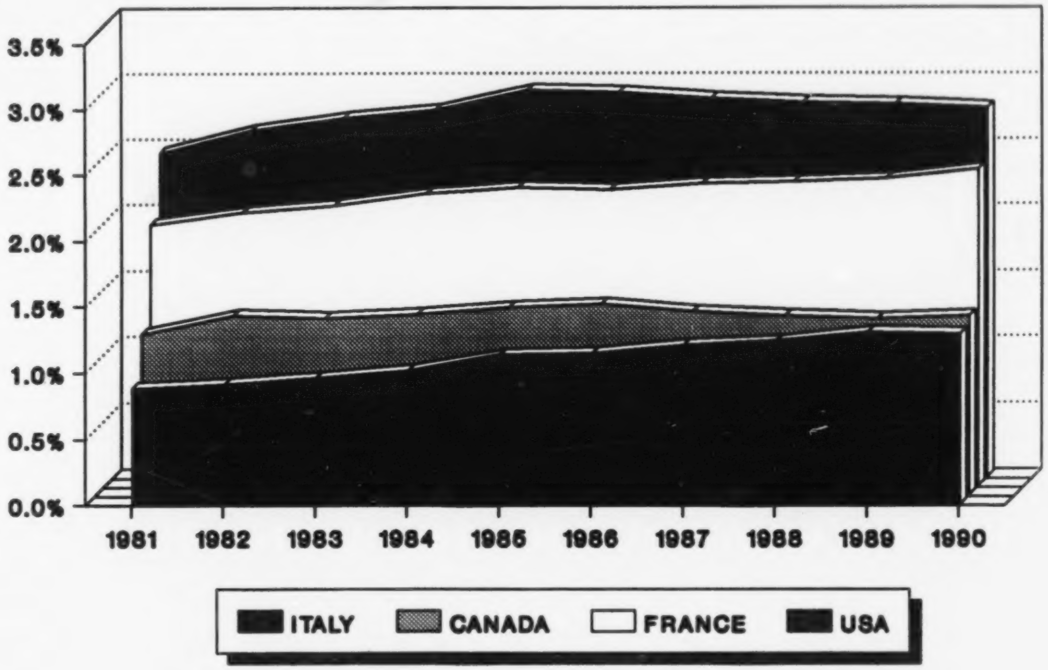
[2] Adjusted. See OECD, Science and Technology Indicators no. 2: R&D, Invention and Competitiveness.

[P] Provisional.

[E] Estimate.

[3] Constant Purchasing Power Parities. See OECD, Basic Science and Technology Statistics, 1991.

GERD AS PERCENT OF GDP
SELECTED G7 COUNTRIES



The ratio of Gross expenditures on R&D (GERD) to the Gross Domestic Product (GDP) and per capita GERD provide indications of how much is spent on R&D, compared with overall economy and population. These two indicators provide a more relevant international comparison and take into account the huge differences in size of population and economy.

After Italy, Canada is the G7 country with the smallest GERD/GDP ratio. As well, this low level of spending persisted throughout the period from 1981 to 1990. In 1989, the GERD/GDP ratios of Japan, Germany, and the United States were practically double the Canadian figure. Even Italy, which has long lagged behind, has considerably narrowed the gap with Canada.

Per capita GERD also reflects Canada's relative weakness in research and development. In 1989, Canada spent $227 per capita on R&D, an amount higher only than that of Italy. As well, Canada's per capita GERD expressed in 1985 $ PPP (Purchasing Power Parity) rose 30% between 1979 and 1989, a slower growth than any other country except the UK. In fact, over this period, Japanese and American researchers gained $169 and $141, respectively, compared with $53 in Canada, thus consolidating their substantial lead.

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Government-financed R&D in G7 Countries

Percentage of GERD Financed by Government

	CANADA %	FRANCE %	GERMANY[1] %	ITALY %	JAPAN[2] %	UK %	USA %
1981	49.6	53.4	40.7	47.2	24.9	49.0	49.3
1982	51.0	54.0	..	48.5	23.5	..	48.4
1983	51.7	53.8	38.8	52.4	21.9	50.2	48.4
1984	50.9	53.7	..	52.9	20.5	..	47.7
1985	47.1	52.9	36.7	51.7	19.1	43.4	48.3
1986	46.1	52.5	..	55.3	19.4	41.5	48.1
1987	44.4	51.7	34.7	54.0	19.6	38.7	49.0
1988	44.0	49.9	33.9	51.8	18.1	36.5	48.9
1989[P]	44.0	48.7	32.8	51.6	16.8	..	48.3
1990[E]	43.7	..	32.5	50.6	..	..	48.2

Percentage of GERD Financed by Government Index (Canada = 100)

1981	100.0	107.7	82.1	95.2	50.2	98.8	99.4
1982	100.0	105.9	..	95.1	46.1	..	94.9
1983	100.0	104.1	75.0	101.4	42.4	97.1	93.6
1984	100.0	105.5	..	103.9	40.3	..	93.7
1985	100.0	112.3	77.9	109.8	40.6	92.1	102.5
1986	100.0	113.9	..	120.0	42.1	90.0	104.3
1987	100.0	116.4	78.2	121.6	44.1	87.2	110.4
1988	100.0	113.4	77.0	117.7	41.1	83.0	111.1
1989[P]	100.0	110.7	74.5	117.3	38.2	..	109.8
1990[E]	100.0	..	74.4	115.8	..	..	110.3

Government Intramural R&D Expenditures as Percent of GDP

	%	%	%	%	%	%	%
1981	0.29	0.47	0.33	0.22	0.26	0.53	0.30
1982	0.33	0.52	..	0.22	0.25	0.53	0.31
1983	0.34	0.56	0.34	0.22	0.25	0.50	0.33
1984	0.34	0.58	..	0.25	0.24	0.47	0.33
1985	0.32	0.57	0.35	0.27	0.26	0.46	0.34
1986	0.31	0.57	..	0.25	0.25	0.35	0.33
1987	0.28	0.58	0.36	0.27	0.27	0.32	0.31
1988	0.26	0.57	0.36	0.27	0.26	0.32	0.30
1989[P]	0.26	..	0.35	0.31	0.25	..	0.33
1990[E]	0.25	..	0.34	0.31	..	..	0.35

Government Intramural R&D Expenditures as Percent of GDP Index (Canada=100)

1981	100.0	162.1	113.8	75.9	89.7	182.8	103.4
1982	100.0	157.6	..	66.7	75.8	160.6	93.9
1983	100.0	164.7	100.0	64.7	73.5	147.1	97.1
1984	100.0	170.6	..	73.5	70.6	138.2	97.1
1985	100.0	178.1	109.4	84.4	81.3	143.8	106.3
1986	100.0	183.9	..	80.6	80.6	112.9	106.5
1987	100.0	207.1	128.6	96.4	96.4	114.3	110.7
1988	100.0	219.2	138.5	103.8	100.0	123.1	115.4
1989[P]	100.0	..	134.6	119.2	96.2	..	126.9
1990[E]	100.0	..	136.0	124.0	..	..	140.0

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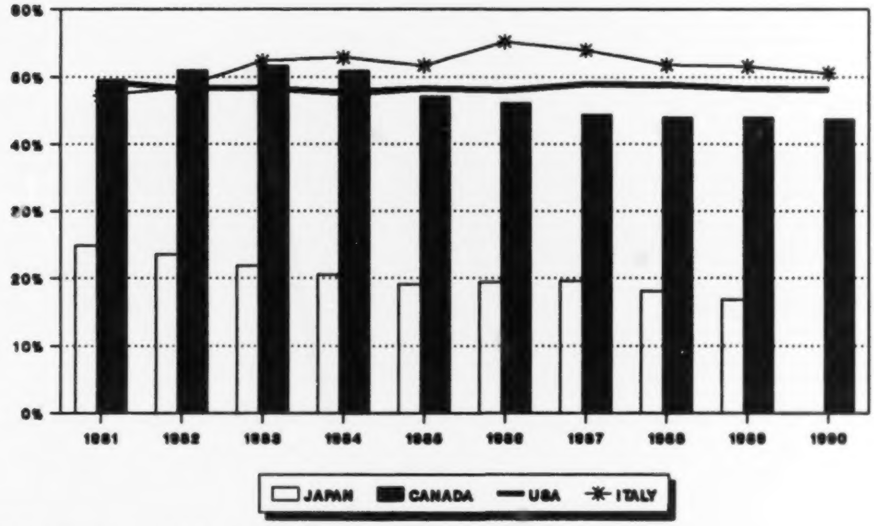
[1] Western Germany only.

[2] Adjusted. See OECD, Science and Technology Indicators no. 2: R&D, Invention and Competitiveness.

[P] Provisional.

[E] Estimate.

PERCENT OF GERD FINANCED BY GOVERNMENT SELECTED G7 COUNTRIES



1990 data not available for Japan

Canada falls in the middle of the G7 countries for the proportion of its GERD financed by government. The government's share of Canada's GERD grew from 49.6% in 1981 to 51.7% in 1983, then fell to 43.7% in 1990. This downward trend in government GERD funding characterized the other partners in the group as well, with the exception of Italy.

Intramural R&D expenditures are all expenditures for R&D performed within a sector of the economy, whatever the sources of funds. Also included in this category are expenditures made outside the sector but in support of intramural R&D.

Over the 1981-1990 period, intramural R&D expenditures by Canada's government sector as a proportion of GDP also declined. This ratio had risen from 0.29% in 1981 to 0.34% in 1984, but a steady drop since then brought the 1990 figure down to 0.25%.

In fact, Canada has lost ground relative to most of its G7 partners. For example, government intramural R&D efforts as a proportion of GDP rose in Italy, France and the United States and remained virtually constant in Germany and Japan. Finally, government intramural R&D expenditures as percent of GDP declined much more rapidly in the U.K. than in Canada.

R&D Personnel in G7 Countries

Researchers (FTE)[1] per 1,000 Labour Force Participants

	CANADA	FRANCE	GERMANY[2]	ITALY	JAPAN[3]	UK	USA
	%	%	%	%	%	%	%
1981	3.4	3.6	4.4	2.3	5.4	..	6.2
1982	3.7	3.8	..	2.5	5.6	..	6.4
1983	3.7	3.9	4.6	2.7	5.9	..	6.6
1984	3.9	4.1	..	2.7	6.0	..	6.9
1985	4.2	4.3	5.0	2.7	6.4	4.4	7.2
1986	4.4	4.4	..	2.8	6.5	4.6	7.5
1987	4.5	4.5	5.6	2.9	6.8	4.6	7.6
1988	4.5	4.8	..	3.1	7.0	..	7.7

Number of Researchers Index (Canada = 100)

	CANADA	FRANCE	GERMANY[2]	ITALY	JAPAN[3]	UK	USA
1981	100.0	105.9	129.4	67.6	158.8	..	182.4
1982	100.0	102.7	..	67.6	151.4	..	173.0
1983	100.0	105.4	124.3	73.0	159.5	..	178.4
1984	100.0	105.1	..	69.2	153.8	..	176.9
1985	100.0	102.4	119.0	64.3	152.4	104.8	171.4
1986	100.0	100.0	..	63.6	147.7	104.5	170.5
1987	100.0	100.0	124.4	64.4	151.1	102.2	168.9
1988	100.0	106.7	..	68.9	155.6	..	171.1

Amount per Researcher (1985 $'000 PPP[4])

	CANADA	FRANCE	GERMANY[2]	ITALY	JAPAN[3]	UK	USA
1981	104.7	140.2	135.6	97.8	84.0	..	126.3
1982	103.8	142.3	..	92.9	87.3	..	126.2
1983	101.8	142.6	135.3	89.1	88.2	..	128.7
1984	103.9	142.6	..	98.9	93.4	..	132.9
1985	104.7	142.5	139.0	110.0	97.9	117.1	136.6
1986	103.2	141.0	..	107.1	96.5	119.0	132.8
1987	98.6	140.8	132.5	111.7	97.9	119.5	131.5
1988	97.5	139.3	..	112.6	100.9	..	132.5

Amount per Researcher Index (Canada = 100)

	CANADA	FRANCE	GERMANY[2]	ITALY	JAPAN[3]	UK	USA
1981	100.0	133.8	129.4	93.3	80.2	..	120.5
1982	100.0	137.0	..	89.4	84.1	..	121.6
1983	100.0	140.1	132.9	87.6	86.6	..	126.4
1984	100.0	137.2	..	95.1	89.9	..	127.8
1985	100.0	136.1	132.8	105.1	93.6	111.9	130.5
1986	100.0	136.6	..	103.8	93.5	115.3	128.7
1987	100.0	142.9	134.4	113.3	99.3	121.2	133.4
1988	100.0	142.9	..	115.4	103.4	..	135.9

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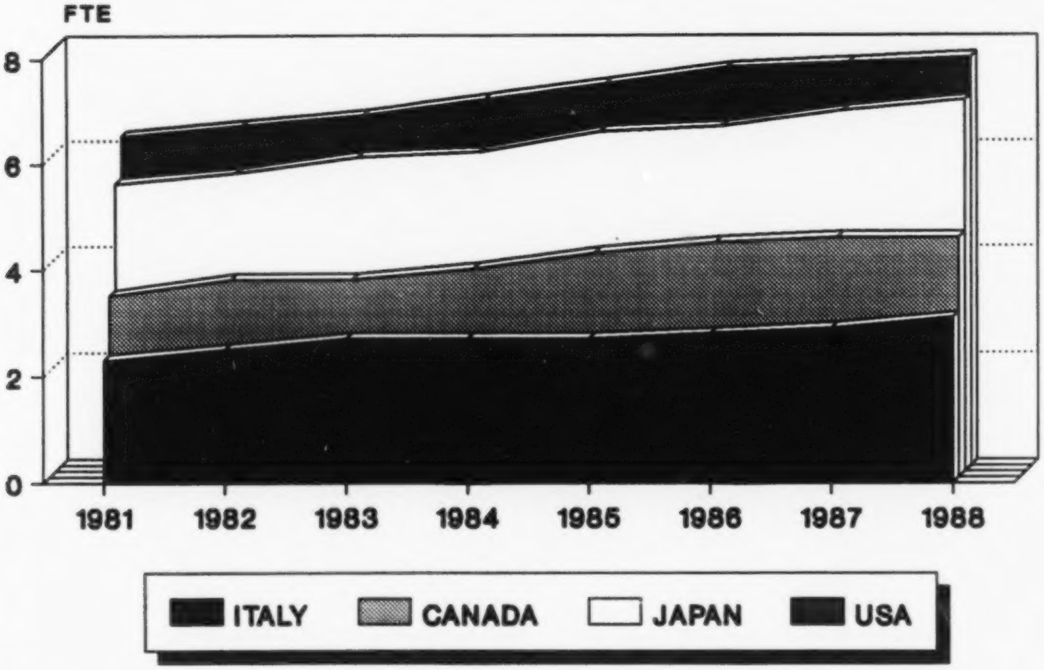
[1] FTE: Full-time equivalent (on R&D).

[2] Western Germany only.

[3] Adjusted. See OECD, Science and Technology Indicators no. 2: R&D, Invention and Competitiveness.

[4] Constant Purchasing Power Parities. See OECD, Basic Science and Technology Statistics, 1991.

RESEARCHERS (FTE) PER THOUSAND LABOUR FORCE PARTICIPANTS



Researchers are scientists or engineers, including social scientists, participating in the creation or development of new knowledge, products, processes, methods, and systems. This category also includes managers and administrators working on the planning and management of the scientific and technical aspects of researchers' work. The number of researchers per thousand labour force participants is a fairly good indicator of a country's research potential.

In 1988, Canada had 4.5 full-time equivalent (FTE) researchers for each thousand labour force participants, up from 3.4 per 1,000 in 1981. But despite this growth, Canada still lags far behind Japan and the United States, although the gap has narrowed.

In addition to their small numbers, Canadian researchers also rank among the least funded among the G7 countries. Moreover, in recent years, funding per Canadian researcher has declined while funding in partner countries has risen.

In 1988, funding per Canadian researcher was $97,500 (1985 $ PPP = Purchasing Power Parity of 1985 dollars), a drop from $104,700 in 1981. This placed them behind researchers in all other G7 countries, whereas at the beginning of the period, they had been ahead of the Japanese and Italians.

HERD In G7 Countries

HERD as percent of GERD

	CANADA	FRANCE	GERMANY[1]	ITALY	JAPAN[2]	UK	USA
	%	%	%	%	%	%	%
1981	25.6	16.4	15.6	17.9	17.6	13.3	14.5
1982	25.2	15.9	..	18.6	17.1	..	13.5
1983	25.2	15.8	14.7	19.3	16.5	13.9	13.2
1984	23.8	15.4	..	18.8	15.5	..	12.8
1985	22.7	15.0	13.5	19.2	14.2	14.3	12.7
1986	22.6	15.0	..	19.7	14.0	14.3	13.6
1987	22.8	15.0	14.6	20.2	14.0	14.8	14.4
1988	23.3	14.8	14.4	20.3	13.3	15.1	14.9
1989[P]	23.3	..	14.1	19.2	12.6	..	15.3
1990[E]	23.7	..	13.9	17.7	..	..	15.6

HERD as a Percent of GERD Index (Canada=100)

	CANADA	FRANCE	GERMANY[1]	ITALY	JAPAN[2]	UK	USA
1981	100.0	64.1	60.7	69.9	68.5	51.9	56.5
1982	100.0	63.2	..	73.7	67.7	..	53.7
1983	100.0	62.9	58.2	76.4	65.3	55.3	52.4
1984	100.0	64.6	..	78.9	65.2	..	53.9
1985	100.0	66.2	59.5	84.3	62.4	63.0	56.1
1986	100.0	66.4	..	86.9	62.0	63.2	60.2
1987	100.0	65.7	63.9	88.6	61.4	64.9	63.0
1988	100.0	63.2	61.8	87.1	56.9	64.5	63.6
1989[P]	100.0	..	60.7	82.5	54.1	..	65.7
1990[E]	100.0	..	58.8	74.6	..	..	66.0

HERD as Percent of GDP

	CANADA	FRANCE	GERMANY[1]	ITALY	JAPAN[2]	UK	USA
	%	%	%	%	%	%	%
1981	0.31	0.32	0.38	0.16	0.38	0.32	0.35
1982	0.34	0.33	..	0.17	0.38	..	0.35
1983	0.34	0.33	0.37	0.18	0.39	0.31	0.36
1984	0.32	0.34	..	0.19	0.38	..	0.36
1985	0.32	0.34	0.37	0.22	0.37	0.33	0.37
1986	0.33	0.34	..	0.22	0.36	0.34	0.40
1987	0.31	0.34	0.42	0.24	0.37	0.33	0.41
1988	0.31	0.34	0.41	0.25	0.36	0.33	0.42
1989[P]	0.31	..	0.41	0.25	0.36	..	0.43
1990[E]	0.32	..	0.39	0.23	..	..	0.44

GERD as a Percent of GDP Index (Canada = 100)

	CANADA	FRANCE	GERMANY[1]	ITALY	JAPAN[2]	UK	USA
1981	100.0	104.3	121.2	50.4	120.8	103.3	114.2
1982	100.0	96.4	..	49.1	111.6	..	103.8
1983	100.0	99.9	110.1	54.7	116.1	93.4	106.9
1984	100.0	104.5	..	58.3	117.3	..	109.8
1985	100.0	105.4	113.8	67.0	115.5	102.9	116.1
1986	100.0	103.1	..	68.5	111.7	102.9	121.7
1987	100.0	108.6	132.2	76.7	118.7	105.7	130.8
1988	100.0	107.7	129.9	79.3	114.8	105.2	133.9
1989[P]	100.0	..	131.7	80.4	116.1	..	139.9
1990[E]	100.0	..	123.0	70.9	..	..	136.7

---

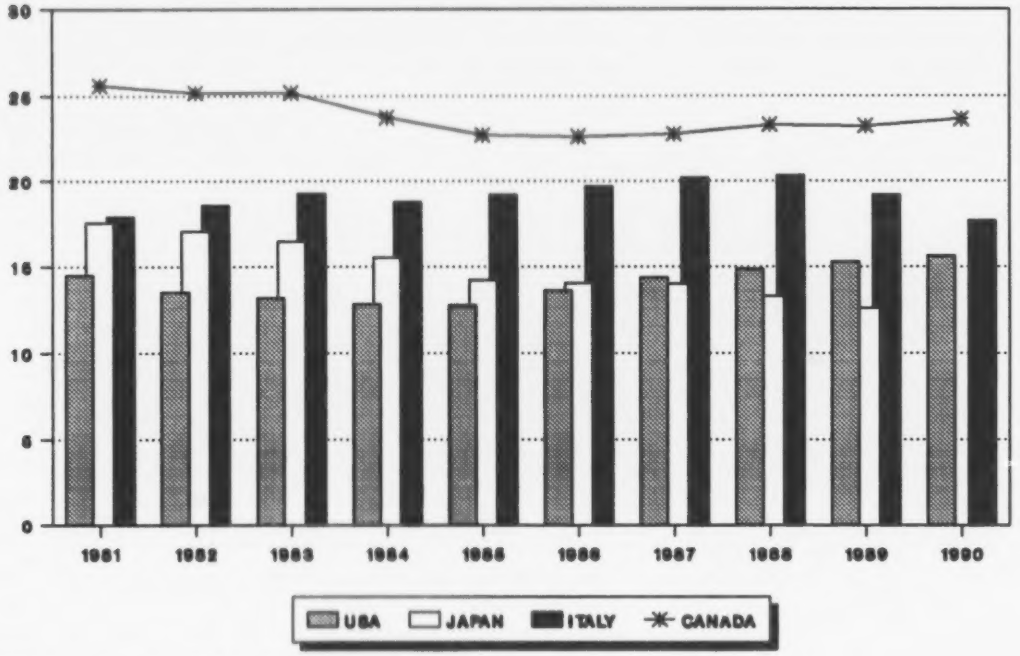
[1] Western Germany only.

[2] Adjusted. See OECD, Science and Technology Indicators no. 2: R&D, Invention and Competitiveness.

[P] Provisional.

[E] Estimate.

HERD AS A PERCENT OF GERD
SELECTED G7 COUNTRIES



1990 data not available for Japan

Canada leads the G7 countries in the university sector's proportional contribution to research and development efforts (i.e. HERD). In 1990, universities performed 24% of Canada's research and development expenditures (GERD). This, however, was down from about 26% in 1981.

Except for Italy and the United States, all the other G7 countries reduced their share of GERD performed by the university sector. The sharpest drop was in Japan, where the university sector's proportion fell from almost 18% to less than 13%. Nonetheless, Canada's performance compared with its partners must be interpreted with caution, since a strong university presence in R&D could reflect either a dynamic university sector or poor performance by all other sectors.

In fact, aside from Italy, Canada's HERD in relation to Gross Domestic Product (GDP) was the lowest in the group.

Moreover, all the countries except Japan gained ground on Canada. Italy and the United States posted the largest gains, picking up more than 20 points in the space of 10 years, with Italy closing in on Canada, and the United States pulling further ahead. The largest gains were made by Italy, which narrowed the gap between itself and Canada, and by the United States, which increased its lead.

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